

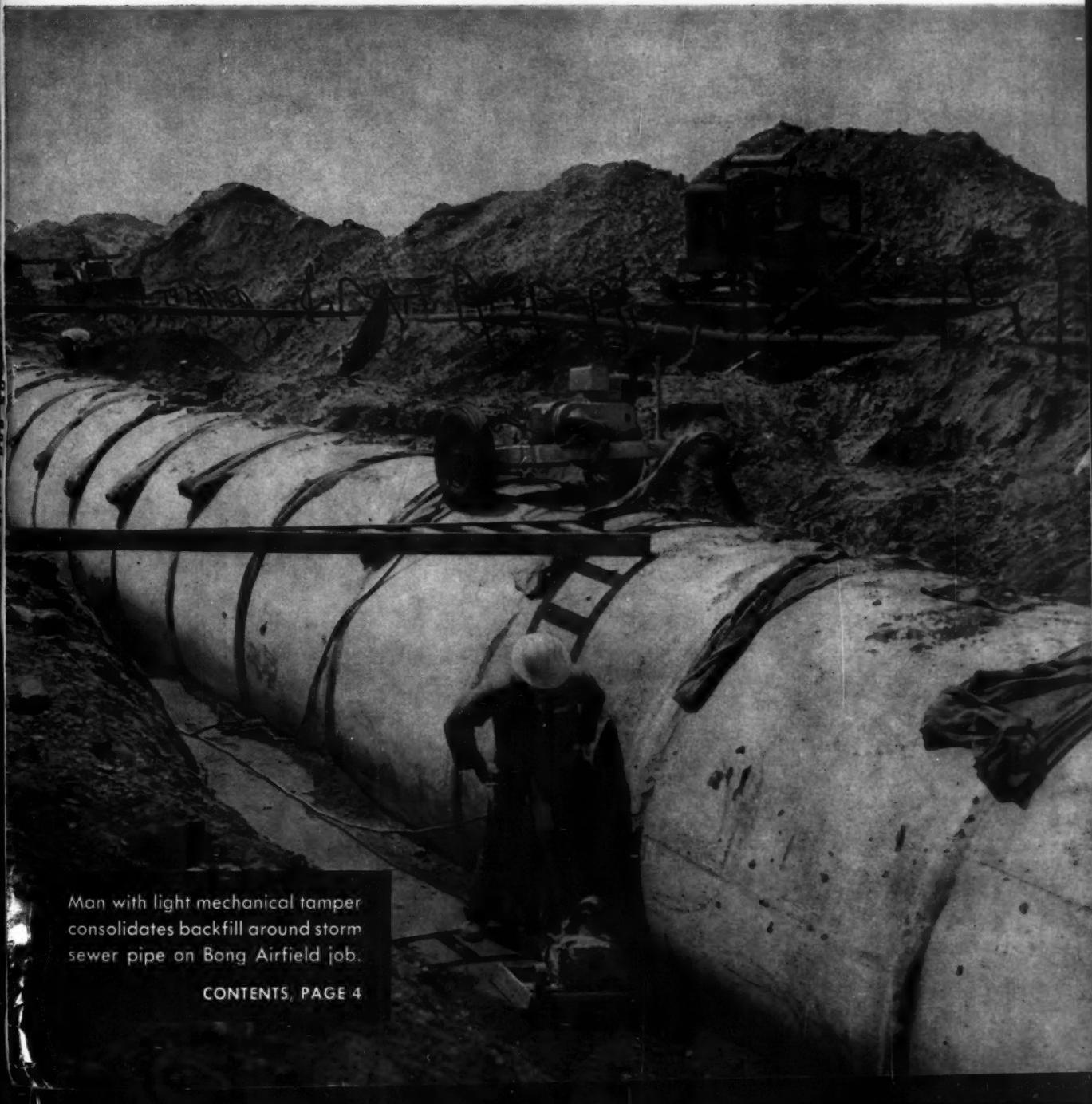
Construction Methods

AND
EQUIPMENT

AUGUST, 1959

PRICE \$1.00

A M C G R A W - H I L L P U B L I C A T I O N



Man with light mechanical tamper consolidates backfill around storm sewer pipe on Bong Airfield job.

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TRIED 3 BRANDS OF WIRE ROPE

Yellow Strand "POWERSTEEL" wins again!

Look at that solid rock face—170' of shoot and shovel down through that tough Tennessee rock. It's a "natural" for a shovel equipped with Yellow Strand POWERSTEEL. That's what Haynes Construction Co., Inc., Bluefield, West Virginia, has found out, too! James J. Chase, General Supt., says, "Out of the three competitive ropes, POWERSTEEL has given the best service on this job. It nets more yardage per hoist rope."

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B.F.Goodrich tires help contractor speed rugged construction of Glen Canyon Dam

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B.F.Goodrich builds the Rock Serv-

ice for just this kind of work. Husky double-chevron cleats pull in forward or reverse, defy rock cuts and bruises. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary cord materials, resist heat blowouts and flex breaks. Result: This B.F.Goodrich cord body outwears even the extra-thick tread, can be retreaded over and over.

Other B.F.Goodrich products at work at Glen Canyon include conveyor belting, air hose and fire hose. Special maintenance and service for tires and industrial products are also in operation—all part of the new B.F.Goodrich Unified Contractor Program. No matter what your off-the-road job, B.F.Goodrich

is ready to serve you—and help you save. Your Smileage dealer is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

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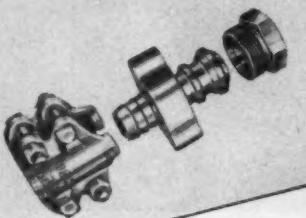


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Construction Methods AND Equipment

AUGUST, 1959

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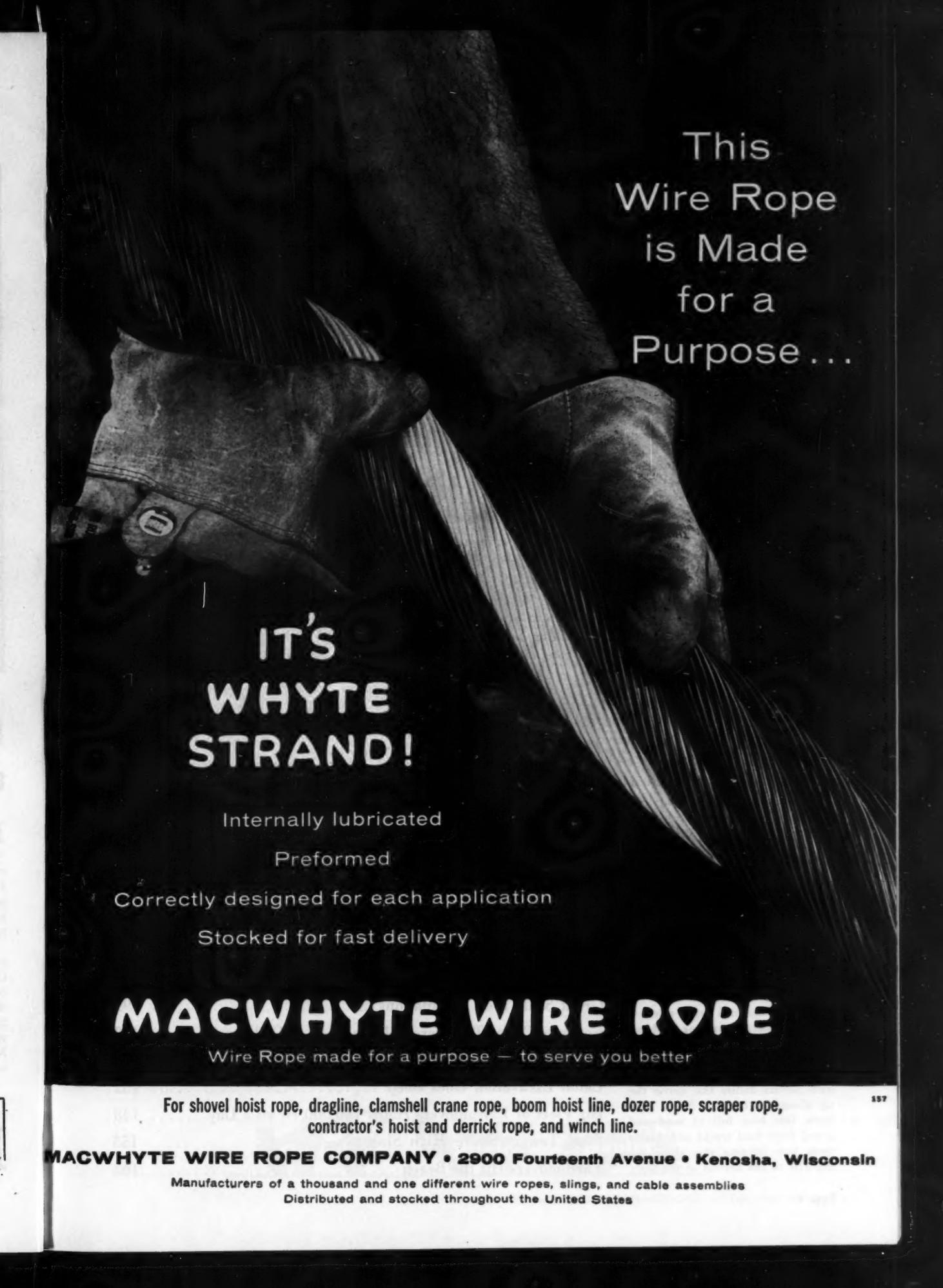
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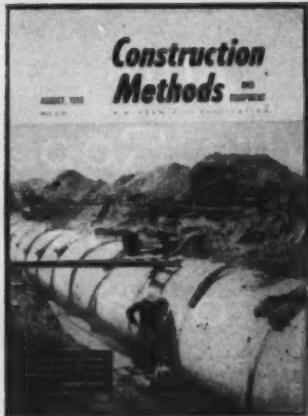
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ON THE COVER

A workman consolidates the backfill around a 96-in. concrete sewer pipe at Bong Air Force Base near Kansasville, Wis. The Jackson hand tamper is powered by a 2.5-kva generator on top of the pipe. The ladder for access to generator has been swung up from trench bottom to give operator working space. A Griffen wellpoint system keeps the trench dry during pipe laying. Complete story is on page 148.

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NEXT MONTH

A specially designed crane solves a complex material handling problem for the builder of a filtration plant in Chicago. Mounted on beams spanning the filter beds, the crane's drive train powers dollies that move the rig along the rows of filters. The crane lifts bins full of sand and gravel from haul trucks and dumps them into hoppers that chute the material to the bottom of the beds.

AUGUST, 1959

Pay Dirt in This Issue

Big Earthmovers Set

Fast Pace on Navajo Dam . 74

Just about every type of earth-moving equipment gets in the act at Navajo Dam—scrapers, loaders, draglines, trucks. A feature is a unique, self-propelled roller.



Paving a Full Year

Ahead of Schedule 88

Already well ahead of schedule, this contractor is averaging 2,000 ft of pavement a day with just one paver. By adding another they'll double that rate, clean up job by October.



Mechanical Mole

Chews Through Shale . 104

An improved model of the tunnel boring machine at Oahe Dam cuts a 29½-ft bore with one cutter-head—bigger than the original "mole" managed with two cutter-heads.



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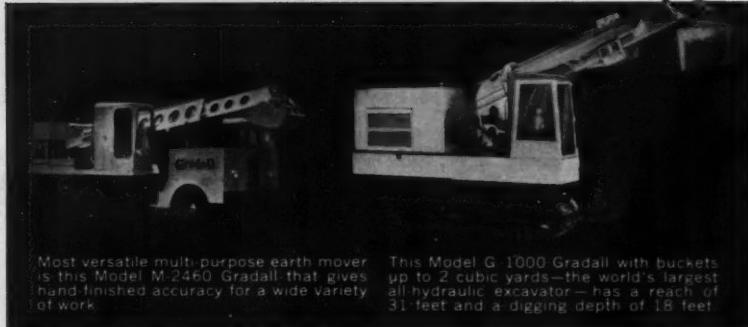
Canal Excavation Goes Deep 132

Big Fleet of Earthmovers Hauls 130,000 cu yd a Day 148

Steel Towers Shore High Slab 155

Earthmovers Hit the Beach 163

NOW A COMPLETE LINE OF HYDRAULIC EXCAVATORS



Most versatile multi-purpose earth mover is this Model M-2460 Gradall that gives hand-finished accuracy for a wide variety of work.

This Model G 1000 Gradall with buckets up to 2 cubic yards—the world's largest all-hydraulic excavator—has a reach of 31 feet and a digging depth of 18 feet.

NEW GRADALLS...



Model 200 Hopto provides a $\frac{1}{2}$ yard bucket under complete hydraulic control, a 200-degree swing and a 14-foot digging depth. This is available on the truck-mount shown, also on wagon and crawler mounts.

Outperforming larger, mechanical type equipment is easy for this Model 500-TM heavy-duty Hopto Backhoe with bucket up to $\frac{3}{4}$ yard. It provides a 20-foot digging depth and 360-degree swing.

NEW HOPTOS...

All Gradalls® and Hoptos® feature full hydraulic power with positive hydraulic control—to combine more movements with fewer controls than any other machines. This insures a more efficient working cycle to speed job completion.

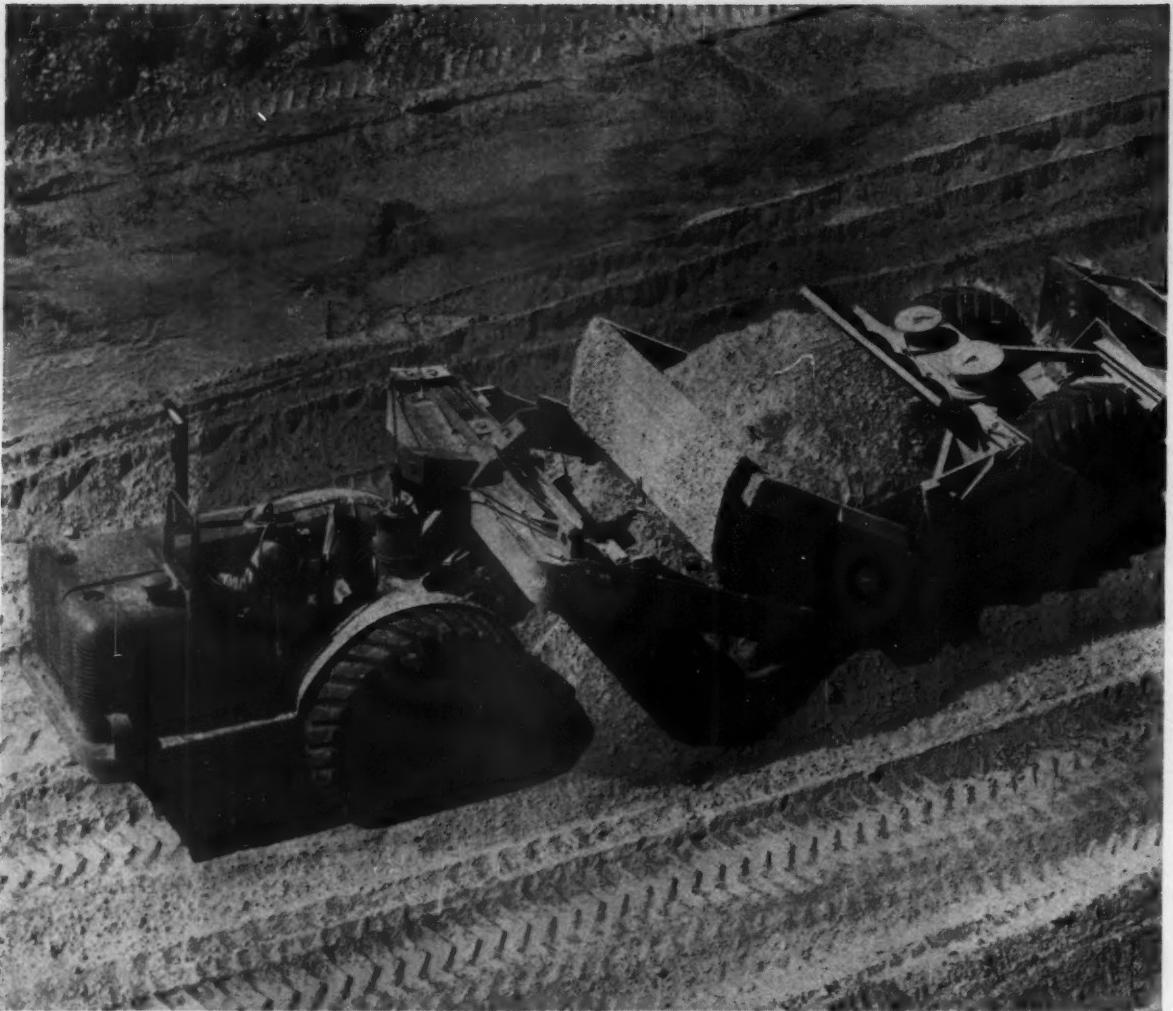
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CONSTRUCTION EQUIPMENT DIVISION

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Rock Grip Excavator
Wide Base

Rock Grip Excavator

When ordering new equipment always specify Firestone tires—available tubeless or tubed.

Firestone
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PUT MORE BITE IN YOUR BRIDGE WORK

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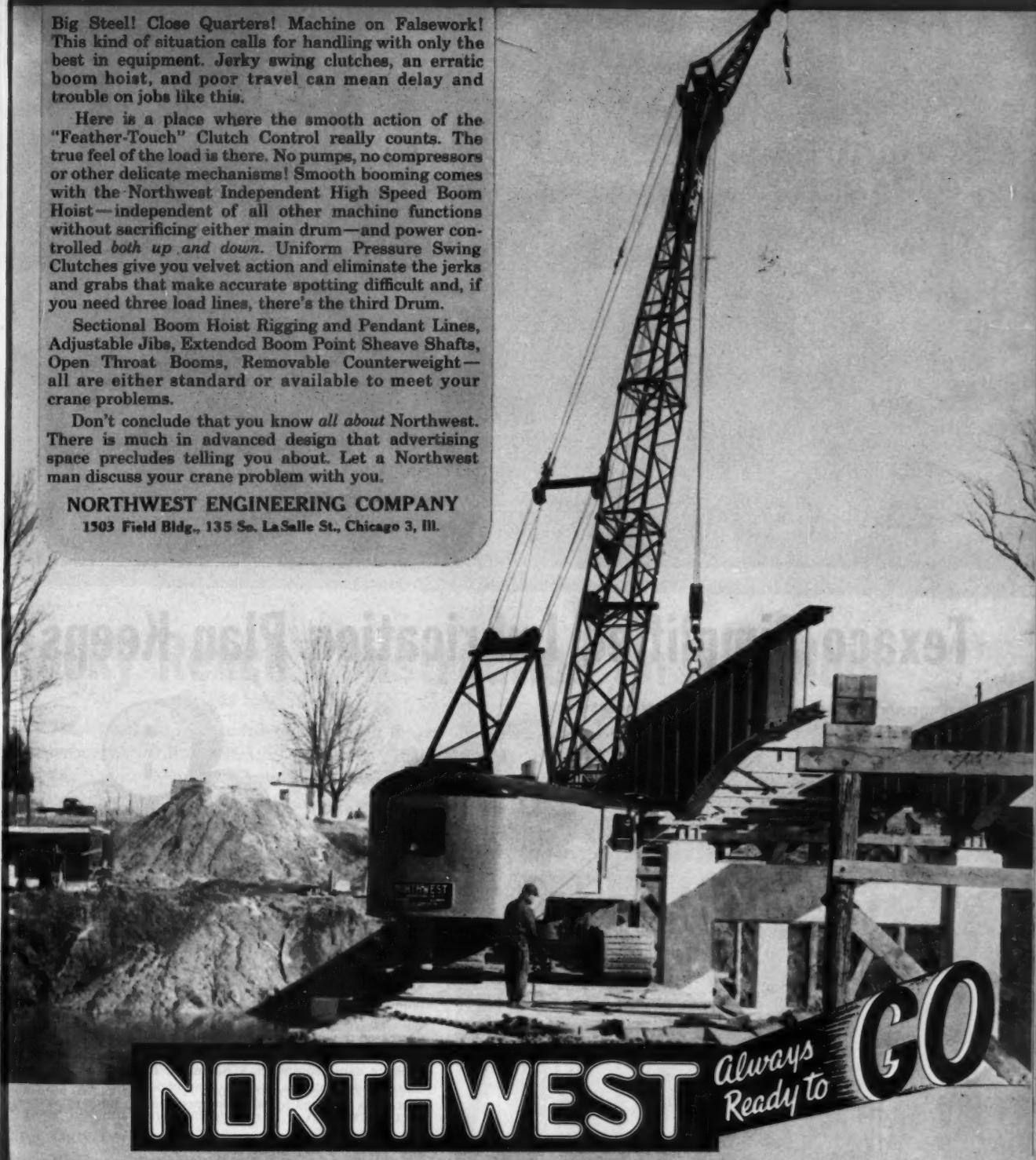
Here is a place where the smooth action of the "Feather-Touch" Clutch Control really counts. The true feel of the load is there. No pumps, no compressors or other delicate mechanisms! Smooth booming comes with the Northwest Independent High Speed Boom Hoist—*independent of all other machine functions without sacrificing either main drum—and power controlled both up and down*. Uniform Pressure Swing Clutches give you velvet action and eliminate the jerks and grabs that make accurate spotting difficult and, if you need three load lines, there's the third Drum.

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Capacity

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Capacity



Texaco Simplified Lubrication Plan Keeps



W. N. EVANS
(left),
Contractors
Manager for
Rocky Reach
Contractors,

points out that the general high production rate on the job can be attributed to extended machine life and decreased downtime. He specified Texaco lubricants after thorough experience with these products in previous major Western dam projects. E. S. Saunders, Texaco Contractor Sales Representative, helped him choose the six basic lubricants required for all equipment on the job.



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Super
Ursa C

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Rocky Reach Dam and Powerhouse on the Columbia River is being constructed for the Public Utility District No. 1 of Chelan County, Wenatchee, Washington. The Project was designed by Stone & Webster Engineering Corporation and construction is under their supervision.

Contracts approximating \$70,000,000 for its construction were let in two stages. Both contracts were held by a contracting group called Rocky Reach Contractors. Members of the group are L. E. Dixon Co., The Arundel Corporation, Guy F. Atkinson Co., The Hunkin-Conkey Construction Co., and American Pipe & Construction Company. Contractors Manager is W. N. Evans, Vice President of L. E. Dixon Company.



Rocky Reach Construction on Schedule

Only six lubricants are needed to handle all major requirements on the Rocky Reach Dam project. That's how the Texaco Simplified Lubrication Plan keeps inventory down, cuts handling and storage costs, helps maintenance personnel sidestep the dangers of misapplication. Here's what Contractors Manager W. N. Evans has to say about it:

"The high production we've been getting from our equipment at Rocky Reach Dam is due in large measure to the help we've had from Texaco. The Texaco Lubrication Plan—and the service that goes with it—really help keep our equipment on the job. We've had little downtime and we're getting longer machine life."

Mr. Evans and the local Texaco Lubrication Engineer chose the six basic Texaco lubricants to meet the requirements of the project after a complete lubrication survey of all equipment. Their selections: 1) *Texaco Ursa Oil Super Duty* for all super-charged engines; 2) *Texaco Ursa Oil Heavy Duty* for all other diesel and gasoline

engines and air compressors; 3) *Texaco Rock Drill Lubricant EP*; 4) *Texaco Marfak Multi-Purpose 2* for all grease applications; 5) *Texaco Track Roll Lubricant*; and 6) *Texaco Crater Fluids* for open gears and wire rope.

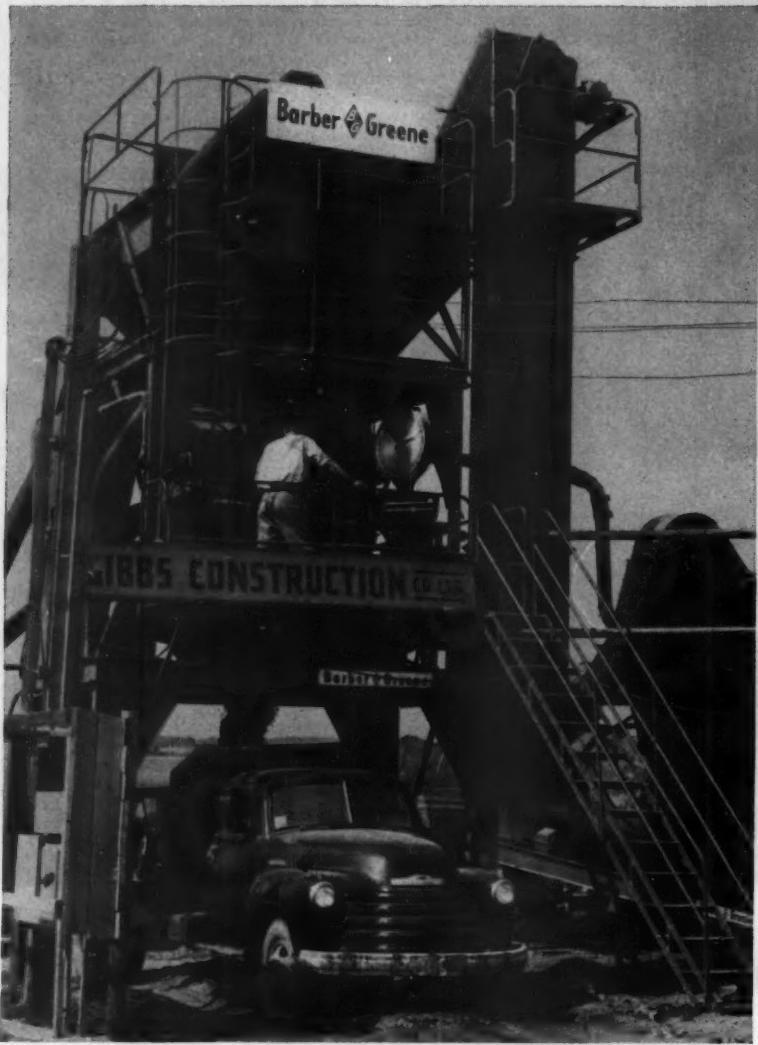
Your Texaco Lubrication Engineer can show you how much the Texaco Simplified Lubrication Plan has saved other contractors—how it can help you. Call the nearest of the more than 2,300 Texaco Distributing Plants, or write Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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Barber-Greene Batch Plants
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batch plants**

Incorporating job-proved advantages of the famous Barber-Greene Batch-Omatics, these two plants also have many new features, including:

- **New Batchometer Asphalt Metering System** automatically meters preset quantity of asphalt to pugmill for each batch.
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- **Hydraulically Operated Pugmill Discharge Gate** provides instant discharge of mix . . . eliminates segregation. No time wasted between batches.
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CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

Construction News From Washington

**Washington, D.C.
August, 1959**

Threat to Highways

Congress will make sure that additional tax revenues are pumped into the highway trust fund before the close of the session. But the question that's still hanging fire is: Will the additional financing be enough to keep allocations to the states at the level needed to prevent a decline in contract awards?

Pres. Eisenhower is standing pat on pay-as-you-go, and his insistence on this type of financing may force the Democrats in Congress to give up their opposition to any increase in the Federal gasoline tax, now 3c a gallon.

The White House has taken advantage of the popularity of the highway program with the voters. It produced figures showing that without a tax increase contract letting would stop immediately in most states. That's why Democratic leaders are afraid they won't be able to muster enough support for any other type of financing.

If the final highway bill produces less revenue than the 1½¢ increase in gasoline taxes the Administration asked, then all states will have to reduce their planned rates of contract letting to keep in line with the smaller allocations. At stake is about \$4 billion of allocations to states for the interstate network in the two years beginning July, 1960.

The total cost of the highway building program—to produce a modern system of highways by 1975—is now put at \$60 billion for both interstate highways and the ABC network. The Federal contribution to this cost would be about \$46 billion. So far, the Federal government has paid out only about \$5 billion.

Construction Materials Prices

Tennessee Valley Authority has triggered a probe into identical bids by suppliers of construction materials.

Shortly after TVA raised a squawk, the antitrusters of the Department of Justice called a grand jury in Philadelphia to determine whether suppliers of electrical equipment, in particular, should be charged with a violation of the law. In addition, Sen. Estes Kefauver has promised to hold hearings on the matter sometime this fall.

TVA complains that "for many years" it has been getting identical bids from suppliers of cement, some types of electrical equipment, boiler tubing, and many other items. Justice Department officials say they've been checking into such complaints from TVA and other purchasers for some time.

Over the years, the antitrusters have tackled both the steel and the cement industries on identical bidding on government contracts.

(continued on next page)

Construction News from Washington... continued

In fact, identical bids were part of the record that—when it went up through the courts—resulted in the dropping of the basing point system of pricing in both steel and cement.

A New Housing Bill

Congress will deliver to Pres. Eisenhower another housing bill to take the place of the multi-billion dollar bill the President vetoed.

The President's hard-and-fast stand against the first bill is based on evidence that business is booming, and inflation is the big danger plus a conviction that his veto won't slow down existing housing programs enough to hurt the housing industry.

Many of the big heavy construction programs, like the urban renewal program to clear slums, are just getting under way. About \$1.3 billion of projects have been approved—but only 26 projects have been completed. It will take years to start and finish projects already in the works.

The same thing is true of public housing. About 100,000 units can be started without a new law. And half the college dormitories in the \$1 billion program have been built—but about 150 for which money has been allotted have yet to be started.

School Construction Strategy

One real possibility yet this year is a school construction law—something that seemed extremely unlikely only a few months ago.

The White House doesn't want any federal legislation, but the Democrats are cooking up a bit of strategy that could give them a political victory over the President.

The plan is to write a bill providing about \$500 million a year for three years in matching grants to the states for classrooms. It would contain a "needs" formula which the President asked in the past.

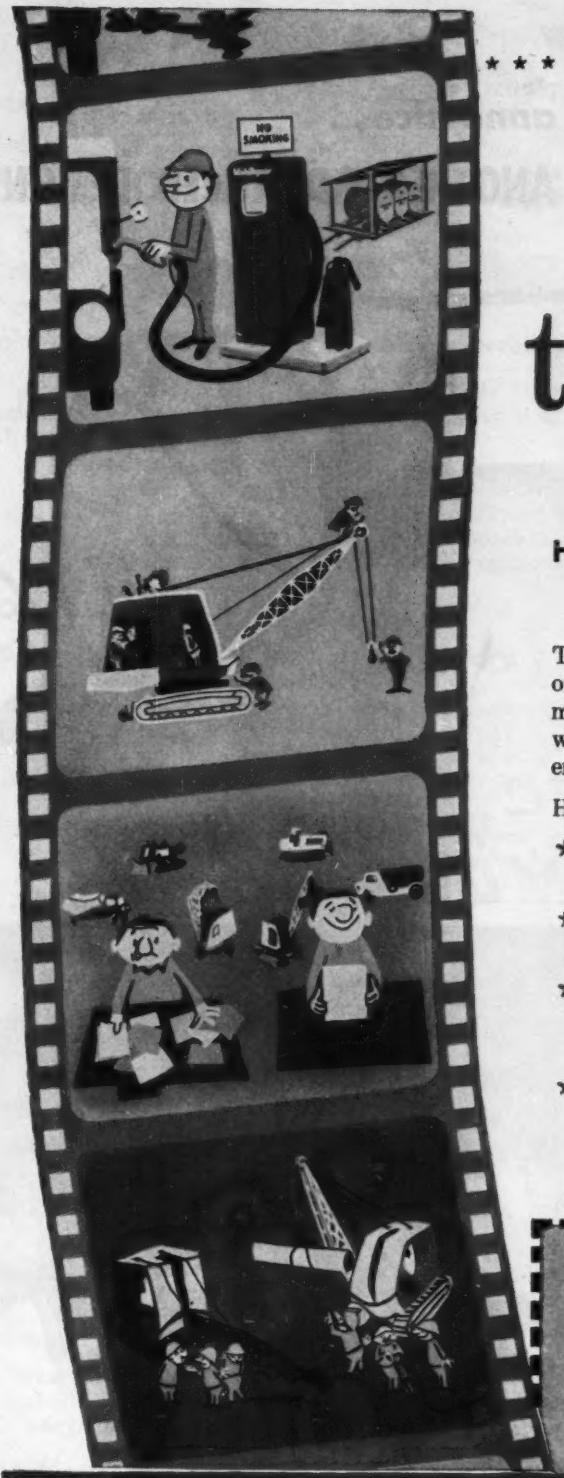
The idea is to deliver to the White House a modified version of the President's own 1957 school construction bill. The Democrats hope this will put him on a spot. Congressional leaders believe the President might oppose such a bill but would not veto it.

There's one Democratic bill already in the works to provide \$1.1 billion a year for four years, but it doesn't stand a chance. Neither does the Administration bill, which would pay half the interest charges on school bond issues.

New Public Buildings Law

Twenty buildings costing \$520 million will get the go-ahead as soon as the Public Buildings Act of 1959, which replaces the old lease-purchase system, passes the Senate. Plans have been completed on all 20.

The new act gives the Public Works Committees of both houses a tighter rein over Federal building projects and centralizes planning in the General Services Administration instead of letting individual agencies put up their own buildings.



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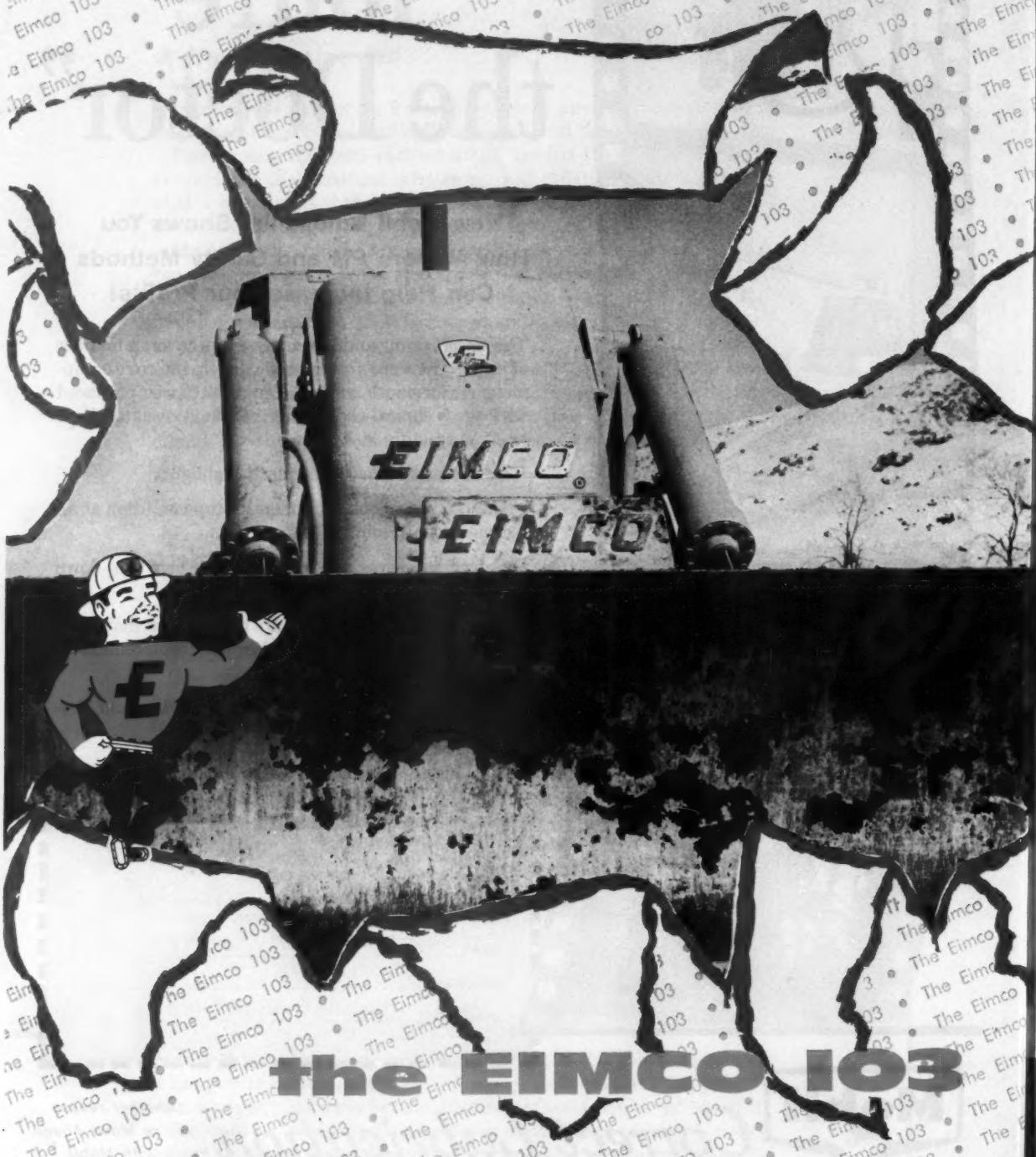
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No other machine can surpass Eimco's rugged custom-built construction. Let us demonstrate the modern Eimco 103 and the famous "Big E", the Eimco 105 Series, to you and your men. You'll agree that here are machines built for the job . . . tailor-made to fill your requirements with rugged long-life quality in every component.

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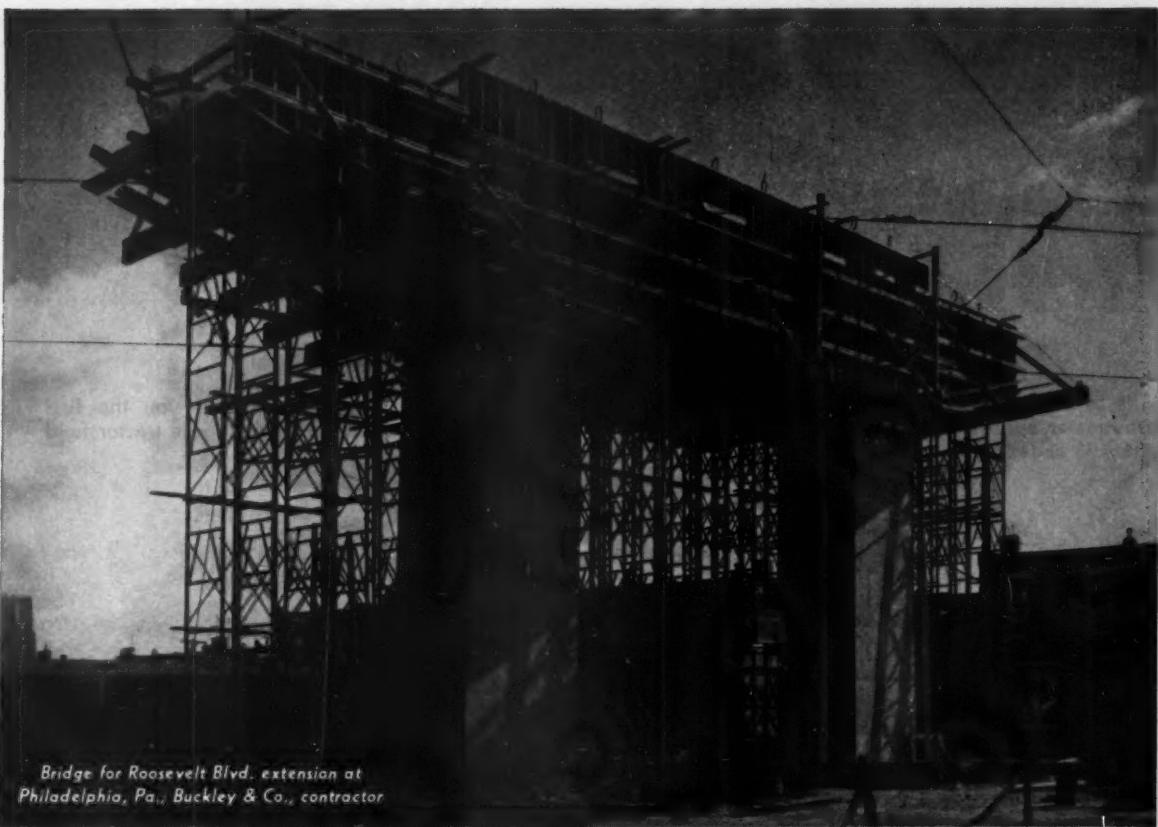
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B-433



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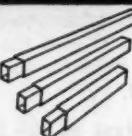


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WRITE TODAY
FOR BULLETIN 118A

SAFWAY
SAFWAY STEEL PRODUCTS, INC., 8228 W. STATE ST., MILWAUKEE 13, WIS.

Lowest-priced, most-advanced construction trucks you can get all from GMC Operation “High Gear”

Operation "High Gear" is the most ambitious engineering, design and quality-control program ever launched in the truck industry. It is paying off for you right now in new truck values and new performance . . . bigger payloads and increased truck life.

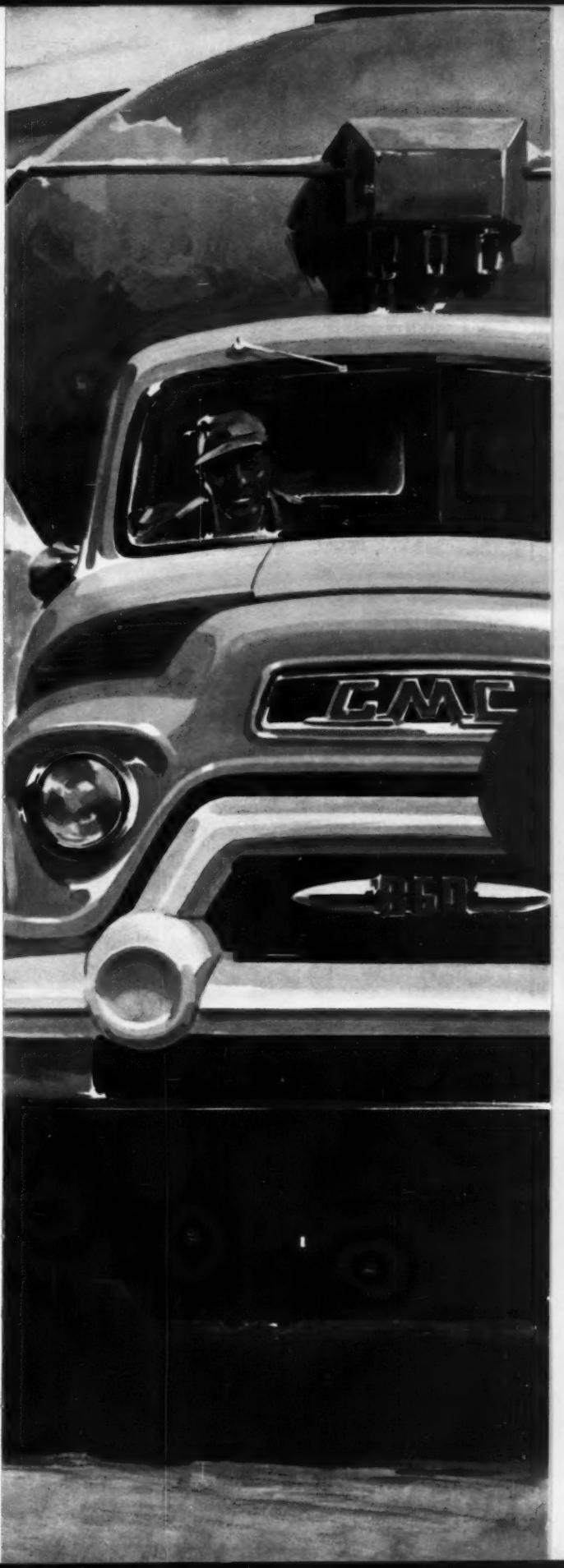
This isn't talk—it's action. Look at these four pages and see for yourself.

SAVE MONEY WHEN YOU BUY A GMC TRUCK! Examples, the bright red 450 model with tandem axle costs up to several hundred dollars less to buy than other models in the 35,000 lb. GVW class! No other pickups compare with the Extra Value features and low list price of the orange Fleet Option. This true-truck-value is throughout the entire GMC Truck line.

SAVE WHILE YOU OWN A GMC TRUCK! The DW970, painted green, with trailerized dump and the yellow D860 bulk cement hauler are proof of the above statement. Here's why: Both are powered by the famous 6-71SE diesel engine that costs the least to own—proved by actual detailed owner records. More owner savings—when you need parts and service, you get everything you need, promptly, at your GMC Dealer. There's no need to go several places and lose valuable time. And remember, one warranty covers every GMC Truck, both chassis and engine.

There are many, many more reasons why GMC Trucks are your best investment, and your GMC Dealer will gladly tell you all. When you contact him, ask about the interesting on-the-job demonstration plan. Also mention that you have been assured of immediate delivery on most models.

GMC Truck & Coach . . . a General Motors Division









GMC OFFERS BIGGEST CHOICE OF COMPONENTS!

There is never any need to "overrate" or "underrate" any GMC Truck or component, regardless of the hauling job. With the availability of hundreds of options, you are always sure to get the one truck with the ideal balance of power, capacity and ratio to keep running costs lowest and profits highest.

All GMC engines are famous for developing full usable horsepower and torque at low, practical engine speeds . . . well known for their exclusive fuel-saving characteristics. You get proved, dependable life. You get plenty of load-moving ability for every construction job without surplus power that increases ownership costs.



130 hp.

140 hp.

160 hp.

217 hp.

200 hp.

232 hp.

152 hp.

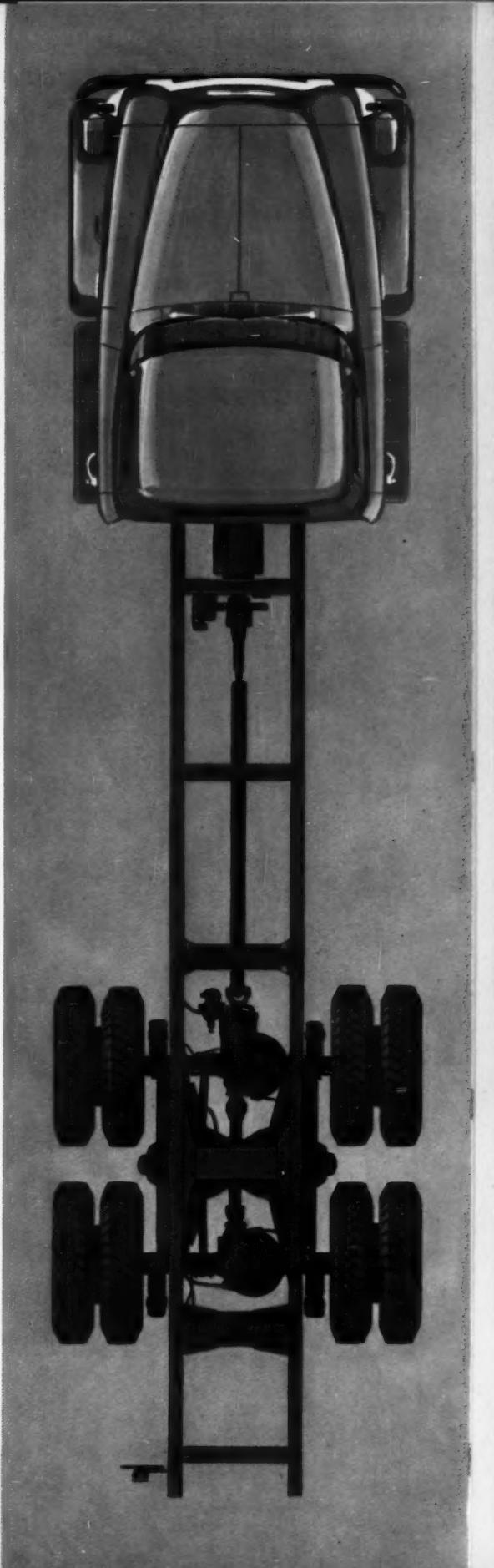
189 hp.

210 hp.

Five basic types of factory-installed frames are offered by GMC. You get extra years of trouble-free service because there is a size and type with adequate strength to support every load on any construction job . . . maintain proper alignment of chassis and body components.



GMC's "Power-Mated" drive-lines eliminate the costly penalties of mismatched transmissions and axles. From the hundreds of combinations, it is easy to get the desired shift pattern and final drive ratios to meet every load condition, gradeability and road-speed requirements . . . efficiently and dependably.



GMC BUILDS BIGGEST CHOICE OF CHASSIS!

From the smallest job to the biggest project, there is a GMC Truck with the ideal load capacity and proper moving ability to save operating costs and keep work on schedule. You never have to compromise with a GMC, because no one builds a more complete line of models. Below are just a few examples.



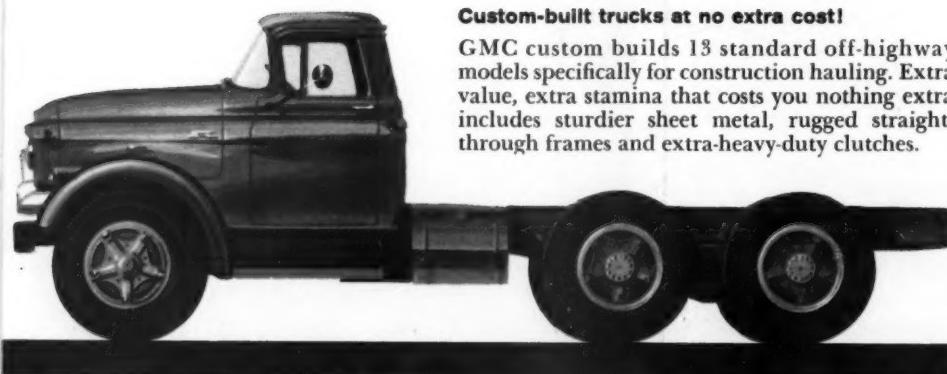
Haul up to 16% more ready-mix every trip!

The big load capacity of this Series FW550 six-wheeler means 24 less trips on 1,000 cubic yard jobs! Equipment includes lightweight heat-treated frame, engine-driven front PTO, aluminum wheels, aluminum saddles and walking beams. Less depreciation and lowest operating costs make this GMC the profitable investment for contractors everywhere.



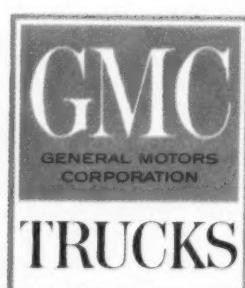
Make your own roads!

GMC's 4x4 Suburban takes soft sand, sticky mud and deep snow right in stride! Carries 8 men up 60% grades! Available with thrifty, fuel-saving Six or mighty V-8.



Custom-built trucks at no extra cost!

GMC custom builds 13 standard off-highway models specifically for construction hauling. Extra value, extra stamina that costs you nothing extra includes sturdier sheet metal, rugged straight-through frames and extra-heavy-duty clutches.



From $\frac{1}{2}$ -ton to 45-ton—
General Motors leads the way!



CB-87

"USS" and "Atlas" are registered trademarks



Atlas White Cement marks the curve day or night

Reflecting concrete curbing made with Atlas White portland cement marks the road's course—every straightaway, curve and turn—well ahead of the driver. By day, the white surface stands out in contrast to darker road paving. By night, saw-toothed corrugations reflect the car's headlight beams back to the driver for greater visibility. And rainy weather actually heightens the effect; wet curb surfaces become even more reflective.

For more information on the use of Atlas White portland cements in highway and street construction, write Universal Atlas, 100 Park Ave., New York 17, N.Y.

OFFICES: Albany • Birmingham • Boston • Chicago
Dayton • Kansas City • Milwaukee • Minneapolis
New York • Philadelphia • Pittsburgh • St. Louis • Waco



Universal Atlas Cement
Division of
United States Steel

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL
EDWARD KEEBLE CONSTRUCTION CO.
FIRM San Jose, California

RPM DELO Oil keeps tractor on the job 15 years



Still Working after 15 years using RPM DELO Oil in this D-8 Caterpillar operated by Edward Keeble Construction Co. Block, crankshaft, and most other parts of original engine are still in use. Another of firm's D-8's using RPM DELO Oil ran 12,000 hours without engine repairs. When torn down, maximum crankshaft wear was .004".



Crawler Crane, like firm's other heavy-duty equipment, uses RPM DELO Oil. Keeble operates 120 pieces of construction equipment—has as many as 30 jobs going at once.



GMC V-8 10-Yard Dump Truck (left), one of a new fleet of 12, also uses RPM DELO Oil. Mr. Keeble (right), says, "For the past 15 years we have kept our heavy-duty engines in top operating condition with RPM DELO Oil. In several instances engines have actually outlasted equipment."



TRADEMARK "RPM DELO" AND
DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey



Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming

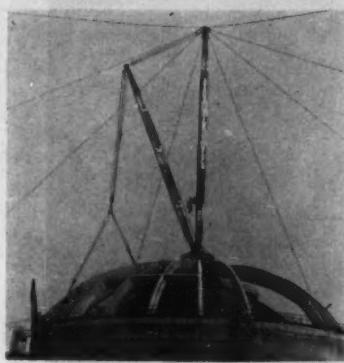


For More Information or field help with any fuel or lubrication problem, contact representative of any company listed, or write direct.

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Job Talk...

Guy Derrick Erects 65-Ton Precast Ribs



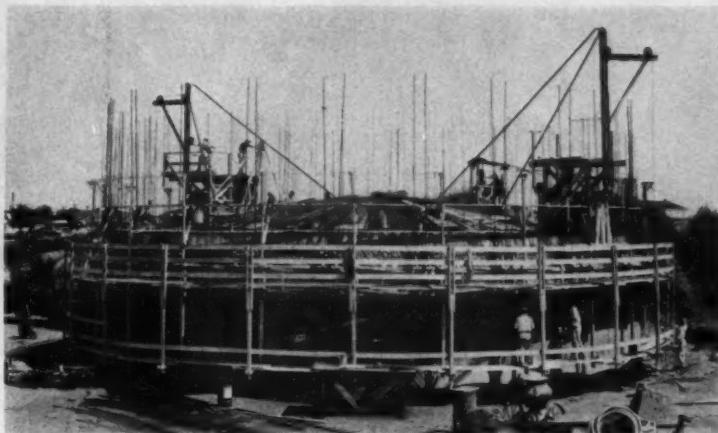
Working near the limit of its capacity, a guy derrick with 185-ft boom stretches 115 ft to pick up giant ribs that frame the dome over Consolidated Edison Co.'s nuclear reactor at Indian Point, N.Y.

Walsh Construction Co., New York, erects two of the ribs per day, following a carefully planned sequence. A pair of ribs goes up on one side of the 180-ft dia. dome and connecting struts are added. Then a balancing pair of

ribs is placed on the opposite side. In this way Walsh will work around the dome, alternating from side to side, until all 24 ribs are in position.

At the center of the cylindrical reactor housing, a tubular steel mast supports the guy derrick (it belongs to Chicago Bridge & Iron Co., who used it to erect the steel sphere inside the cylinder) and also holds the interior end of the precast ribs during erection. After all ribs and struts are in place, Walsh will pour a compression ring at the center of the dome. Then precast planks will be set in the gaps between ribs to complete the dome.

All the structural components—ribs, struts, and planks—were cast at the site. To make sure the pieces all would fit together properly, tolerances were tight. Concrete Accessories Corp. manufactured the forms to an accuracy of $\frac{1}{8}$ in. in 86 ft across the chord of each rib. They sent a crew to the job site two months before casting began to erect and true the rib forms.



Dome Form Does Double Duty

Formwork for a 65-ft-dia dome capping a prestressed concrete standpipe in Sayreville, N.J., also serves as a convenient work platform and storage area during construction.

Resting on top of a slipform that brings up the 13-in.-thick

walls of the cylinder, the dome formwork rode to the top of the 122-ft high tank as concrete in the wall was built up. An 8-ft-wide ring of planks at the outer edge of the form served as a work platform for concreting

continued on page 26

LABYRINTH WATERSTOPS

A SOUND INVESTMENT
FOR CONCRETE CONSTRUCTION!



LABYRINTH AVAILABLE IN 2, 3 or 4 in.

ON YOUR CONSTRUCTION:

1. Consider the investment in design, materials and labor (to mention a few).
2. Then consider how important safe, secure watertight concrete joints are.
3. Thorough watertightness can be secured by installing Labyrinth Waterstops—a dividend that makes the low initial cost of the product insignificant when compared to your total investment—and one that insures watertight concrete joints for years!

- Corrugated ribs grip concrete, insure an everlasting bond between joints.
- Finest polyvinyl plastic resists chemical action, aging, severe weather.
- Takes just seconds to nail to form...easy to cut and splice on location (prefabricated fittings available).
- There's a Water Seal product for every type of concrete work!

If your aim is to stop water seepage, stop it effectively with Water Seals' Waterstops!

"See Us in SWEET'S"
New Literature and Free Samples Sent on Request—Use Coupon Below

WATER SEALS, inc.

9 SOUTH CLINTON STREET, CHICAGO 6, ILL.

Made in Canada for J. E. Goodman Sales, Ltd.
Toronto, Ontario

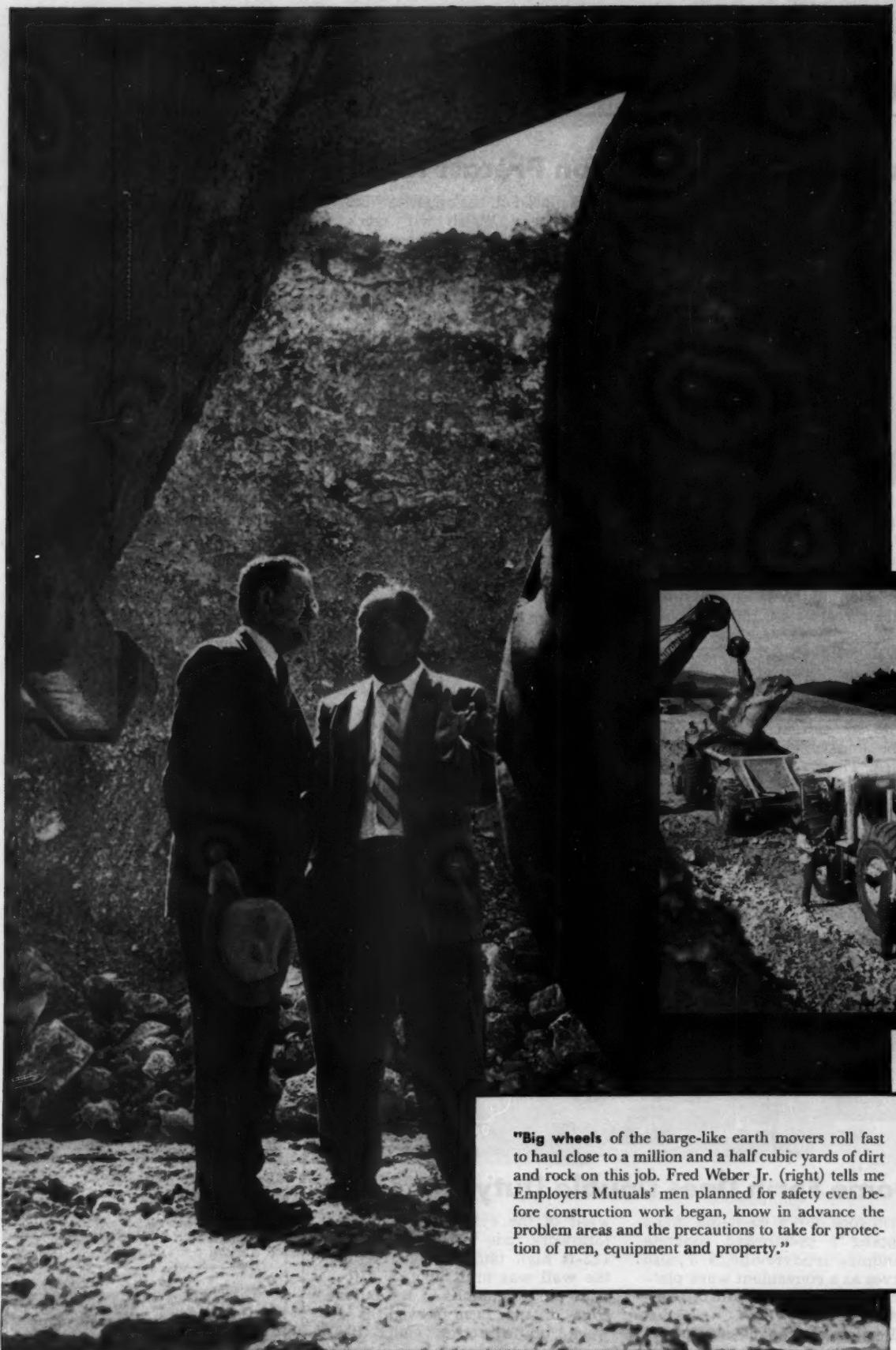
WATER SEALS, INC. DEPT. 2
9 S. Clinton Street
Chicago 6, Illinois
Please send free sample and descriptive literature.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____



"**Big wheels** of the barge-like earth movers roll fast to haul close to a million and a half cubic yards of dirt and rock on this job. Fred Weber Jr. (right) tells me Employers Mutuals' men planned for safety even before construction work began, know in advance the problem areas and the precautions to take for protection of men, equipment and property."

Wausau Story

ON THE ROAD AHEAD



by LOUIS W. PRENTISS

Major General U.S. Army (Ret.)
Executive Vice President
American Road Builders' Association
Washington, D.C.

"As part of the highway industry, you know that our country's roadbuilding program represents the biggest construction job the world has ever seen. And you also know that the problems the work poses are almost equal to the magnitude of the task.

"Recently I visited a roadbuilding project just southwest of St. Louis on Interstate Highway 44. The work is being done by the St. Louis County Bridge and Grading Company in joint venture with its parent company, Fred Weber, Contractor, Incorporated. In talking with Mr. Weber and his two sons, Fred Jr. and John, we discussed problems contractors face in this type of construction and the need for planning ahead.

"The Webers told me they were impressed with a service offered by their insurance carrier, Employers Mutuals of Wausau. Using blueprints and specifications, and following this up with a study of the actual site, they give advance quotations on insurance costs. The Webers say this Pre-Bid Service enables them to make a more accurate appraisal of their costs. It also serves as a guide and check on the hazards likely to be encountered on the job.

"As the construction work goes on, Employers Mutuals men continually help maintain safe working conditions and procedures. That's good business. Safety pays not only in dollars and cents, but also in humanitarian benefits. 'Employers Mutuals men give us the kind of help we need,' says Mr. Weber.

"With this kind of safety-conscious planning, the Webers and other progressive contractors are keeping Interstate System costs down . . . giving the taxpayers the most road for the tax dollar. I'd say that makes Wausau men 'good people to do business with.'

As one of the leading insurers of construction projects in America, Employers Mutuals of Wausau recognizes its obligation in working with contractor-policyholders to make their jobs come out safely and profitably. Our safety engineers are backed by a staff of construction specialists. With 109 offices throughout the United States, personal service is never more than a few hours away. We write all forms of fire, group and casualty insurance (including automobile) and are one of the largest writers of workmen's compensation. Consult your telephone directory for your nearest Wausau Man or write us in Wausau, Wisconsin.



"Table talk sets the day's work. Jim Miller (second from left) is an Employers Mutuals' Safety Engineer, works closely with Fred Weber and his sons, Fred Jr. and John. Before Webers submitted bid, Employers Mutuals quoted insurance costs."



"Cross roads. During construction here, heavy equipment must often cross busy Highway 66. With Employers Mutuals' help, the Webers have set up one of the most effective safety-signal systems I've ever seen on a job."



"All clear, when rock is blasted means Employers Mutuals' men have already determined safe charges, have seen to it that all nearby property owners have been told what's happening and have suggested other hazard controls."



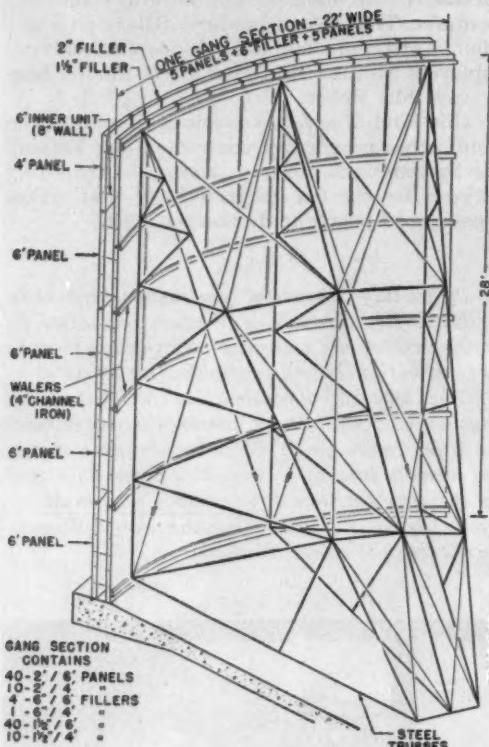
"Good people to do business with"

Employers Mutuals of Wausau

Another version of this Wausau Story for the public appears nationally in
The Saturday Evening Post, Time, Newsweek,
U.S. News and World Report and Business Week

*New use for Symons Steel-Plys
in gang forming...*

28' CIRCULAR WALLS GANGED FOR SEWAGE PLANT



2,300 square feet of forms on inside ganged section stripped and reset by crane in 3½ hours.

8 men in less than 8 hours erected 2,300 square feet of forms and scaffolding on inside plus pouring the concrete.

Friebel & Hartman, Shelby, Ohio contractor ganged Symons Steel-Ply Forms on the Mansfield, Ohio Sewage Treatment Plant. The project consisted of four digestors, each 80 feet in diameter and 28 feet in height and 8 inches thick with no horizontal joints.

4 Ton Sections

Four ganged sections were used—each 22 feet wide and 28 feet high. This allowed pouring $\frac{1}{3}$ of a tank at a time. Each ganged unit consisted of four rows of 6' Symons Forms and one row of 4' forms to make the 28' height. Three trusses were used to brace each ganged section. A $\frac{3}{4}$ yard Lorain with an 80' boom handled the sections.

One Pour Every 4 Working Days

What is the Friebel & Hartman verdict on using this method of pouring: "Ganged forming enabled us to place our concrete efficiently and vibrate properly, held bracing costs to a minimum, allowed us one pour every four working days and gave us some very low erection costs."

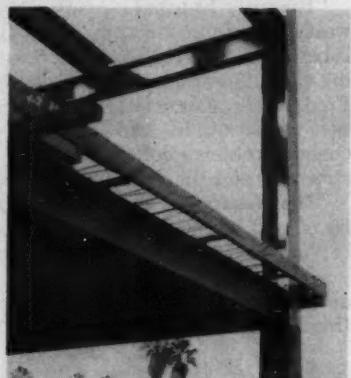
Complete story on the Ohio Sewage Treatment Plant will be sent FREE upon request. Symons Forms may be rented with purchase option.

JOB TALK...
continued from page 23

crews during the slipform operation. Two jib rigs mounted at the edge of the platform hoisted $\frac{3}{4}$ -yd buckets of ready-mix concrete to the top and dumped them into hoppers. Hand buggies carried the concrete from the hoppers to the slipform.

At the center of the dome form the contractor stored 25 tons of reinforcing steel for the circular wall. No reinforcing had to be lifted from the ground once the slipform operation started.

The Preload Co., New York, designers and builders of the tank, brought up the cylindrical wall in one continuous around-the-clock operation lasting 114 hours.



Channels Form Floor Slab

A 7-in. channel that runs around each of the 13 floors of the new International Business Machines Corp. building in Los Angeles serves both as a form for the floor slab and a screed top.

Studs welded to the inside of the channel anchor concrete and reinforcing steel. Others welded to the exterior of the channels support brackets for sunshades.

In addition, 14,000 Nelson shear connector studs end welded to the top flanges of beams in the steel framework resist earthquake uplift and horizontal shear between concrete floor slabs and the beams. The $\frac{3}{4}$ -in. studs, $3\frac{1}{2}$ -in. long, are welded singly at 24 in. spacing on top of all beams.

Builders Steel Co., Los Angeles, steel erectors on the job, installed the studs without scaffolding after steel was in place. They averaged 650 studs a day, driving them with a Nelson NS-9 stud welding gun operated off a Nelwelder battery unit. The job took 28-unit. The job took 28,000 studs.

Symons CLAMP & MFG. CO.

4255 DIVERSEY AVENUE

DEPT. H-9

CHICAGO 39, ILLINOIS

Warehouses throughout the U.S.A.

MORE SAVINGS FROM SYMONS



**GRAVITY
dumped this load...
in ONE second!**

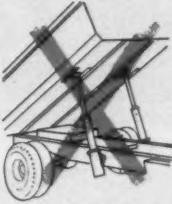
(Also ask about new 10-yard Dumptor)

Output increased 9%

What's the dumping time of your hauling units — 15, 20, 25 seconds? Right there is where you can save time, get more trips an hour by dumping in *one second* with Koehring® 6-yard Dumptor®. It has no slow-acting mechanical hoist. Operator trips the body-release lever, and *gravity* tilts the body 70°. One second later the load is out, and Dumptor is on its way back for the next load.

This adds up to a substantial increase in extra yards hauled per hour. For instance, take a typical 1,000-foot haul where an ordinary dump truck would make 16 trips an hour. Allowing the same time to load, haul and return, Koehring Dumptor would average 17½ trips

on the same cycle. That's because one-second dumping cuts 20 seconds off cycle time — gains a total of 320 seconds, or 5.3 minutes more productive time per hour — gives you 17½ trips, instead of 16. This, alone, adds 9% to hourly yardage output with Koehring Dumptor. But that's not all —



No body-hoist maintenance

There are no expensive body-hoist replacement parts, no hoist maintenance or down-time delays, because *gravity-dump* never balks, never wears out. You get the same one-second dumping *every time*. What's more — Dumptor has no springs — just one big snubber type shock ab-

sorber on steering axle. Big shock absorbing tires eliminate the need for springs on the drive axle. No springs — *no spring maintenance!*

Add up your dump-time, body-hoist and spring-maintenance costs — see for yourself how much you can save by hauling with Koehring heavy-duty Dumptors. Check too, how *no-turn* shuttle-hauling cuts another 15 to 30 seconds off cycle time. Call Koehring distributor about it *today* — or write for new catalog.

KOEHRING DIVISION of Koehring Company, Milwaukee 16, Wisconsin

**KOEHRING®
DUMPTOR®**

K813



EXCAVATORS • CRANES • twinbatch® PAVERS • FINISHERS • MUD-JACK®



SPECIFICATIONS

COMPRESSOR

Normal operating pressure	100 lbs.
Maximum discharge pressure	125 lbs.
Rated capacity	1800 rpm.
No. of cylinders	1
Lubricating oil capacity	6 gals.
Compressed air storage capacity	1.5 cu. ft.
Oil separator	one stage
Air cleaner	dry type
Control	pneumatic
Pressure setting	75-125 lbs.
Differential	10 lbs.

ENGINE

Make	Continental Gas
Model	FA-162-2417
Type	4 cycle
No. of cylinders	4
Bore	3 7/16 in.
Stroke	4 3/8 in.
Oil in crankcase	4 1/2 qt.
Water cooling system capacity	9 qt.
Type of starter	Electric
Fuel tank capacity	17 3/4 gals.
Clutch—Make	Industrial
Type	Disc
Size	Single 8 in.
Hp at sea level	41 hp

DIMENSIONS (skid)

Length	79 in.
Width	27 in.
Height	43 1/2 in.
Net weight	1325 lbs.

DIMENSIONS (pneumatic tires)

Length	121 9/16 in.
Width	61 in.
Height	54 in.
Net weight	1730 lbs.
Tires, size and ply	6:40 x 15-4

Introducing the 85' **SUPER BLUE BRUTE ROTARY COMPRESSOR**

The single stage compressor with two stage economy

At last, here is an 85' rotary compressor with two stage economy and single stage simplicity.

The new Super Blue Brute 85 will operate all day on a tankful of gasoline. This is because the engine runs at a gas-saving 1800 rpm instead of higher speeds.

You get economy without sacrificing power. The compressor is amply-powered with a 162 cubic inch engine that provides a horsepower reserve of over 50%. And like all Blue Brute rotaries, engine life is extended because a clutch allows you to warm-up the engine *without engaging the compressor*.

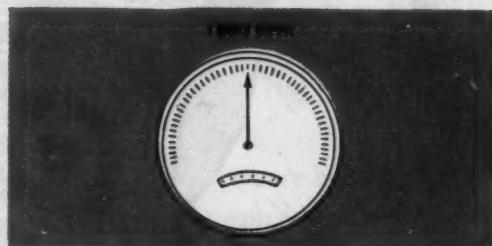
The new rotary is also versatile. It's designed

for high speed towing with a low center of gravity, high speed tires, and a heavy tow bar. No matter what the terrain, you won't have any trouble operating this compressor. It will perform at versatile angles.

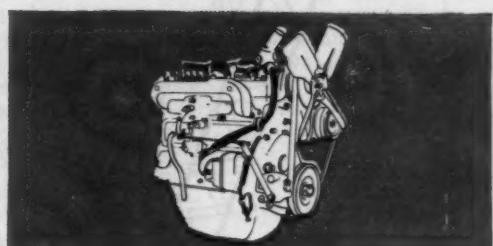
See your Blue Brute distributor for more information. Or write to Worthington Corporation, Section 60-19, Holyoke, Mass. In Canada: Worthington (Canada) Ltd., Brantford, Ontario.



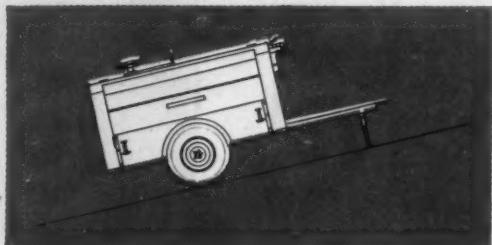
WORTHINGTON



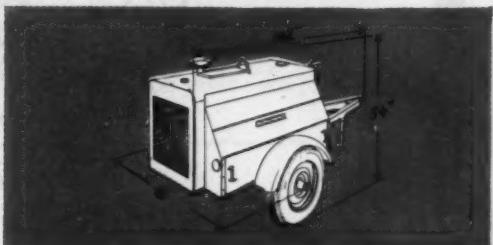
ECONOMICAL. For peak efficiency, engine operates at 1800 rpm instead of higher speeds.



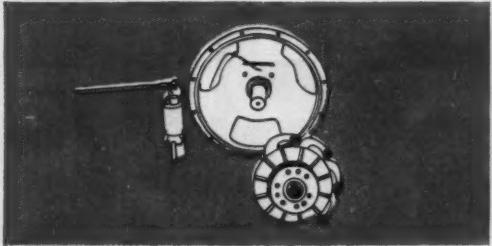
POWERFUL. Amply powered engine has a reserve capacity of over 50%. No altitude problems.



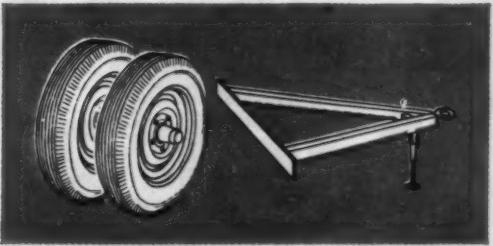
VERSATILE. Compressor can be operated at versatile angles.



COMPACT. Unit is only 54 inches high, 61 inches wide, and 122 inches long (pneumatic tire unit.)



YEARS OF EXTRA LIFE. Clutch allows you to warm up engine without engaging compressor for easier starts.



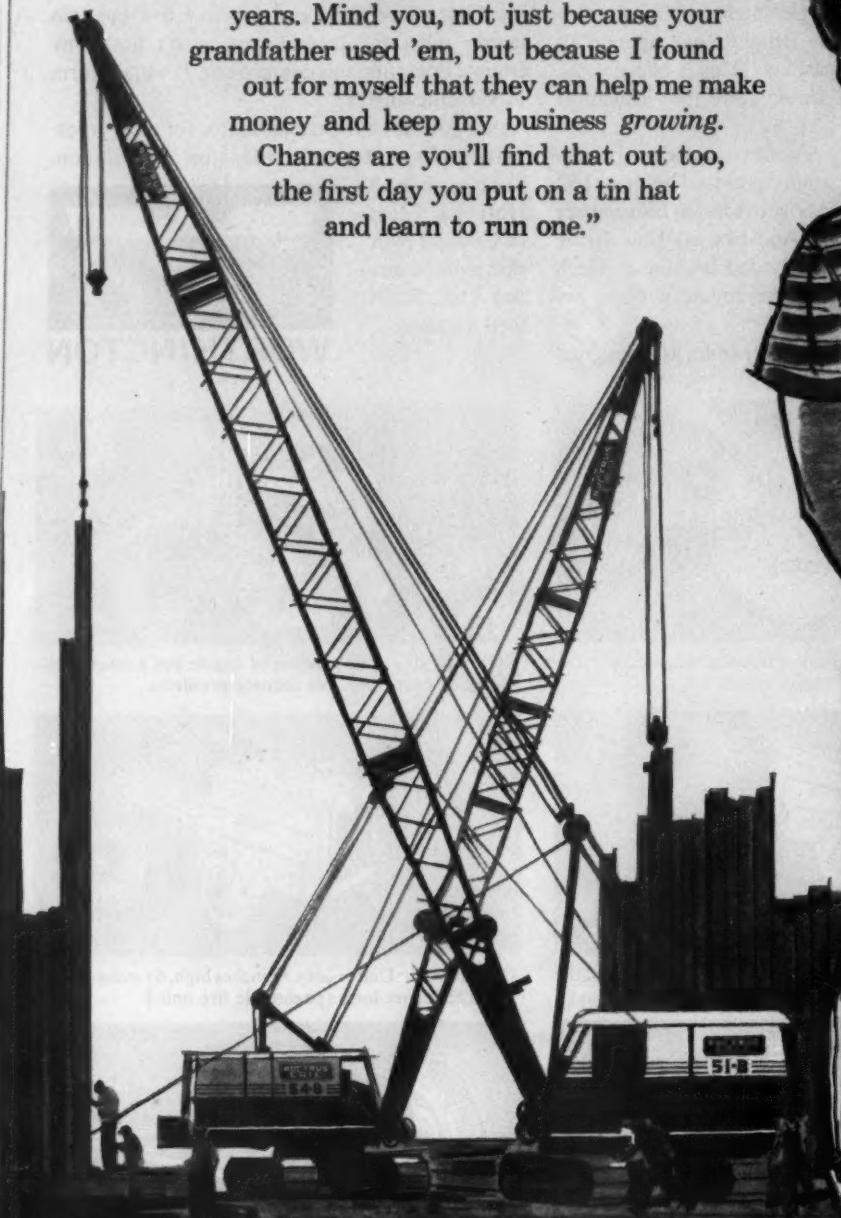
DESIGNED FOR HIGH SPEED TOWING. Unit has high speed tires, and a heavy tow bar.

Dad looked me straight in the eye and said....

"Son, the first thing you learn in this business
is to use good equipment. Take those

Bucyrus-Erie cranes. I've used them for
years. Mind you, not just because your
grandfather used 'em, but because I found
out for myself that they can help me make
money and keep my business growing.

Chances are you'll find that out too,
the first day you put on a tin hat
and learn to run one."



**BUCYRUS
ERIE**

Here's How You can

BALANCE THE POWER · SPEED YOU NEED!



POWER DIRECTOR

On DRAWBAR jobs you need both starting power and running speed. Power Director gives you both—2 speed ranges with quick shifting on-the-go. Low range produces up to 42% more power . . . high range nets over 46% more speed. And remember, there's no foot clutching between speed ranges!



SHUTTLE clutch

BACK-AND-FORTH loading jobs like the one shown above demand quick shifting to save time and energy. The SHUTTLE clutch shifts between forward and reverse with a simple, straight-line move of a lever . . . no foot clutching! Tractor speed is the same in both directions for safe, controlled operation.

Here's why D-14's and D-17's are built to fit you!

They've got the ideal combination of low-profile . . . high-clearance design, and long wheelbase that gives you more feet on the ground throughout every job.

They've got the shortest turning radius in their class (D-14, 8 ft, 1 in). They'll turn a circle almost 4 FEET inside some other tractors.

Whether you're building interstate highways or cutting in sewer trench, you can make money with these tractors! Find out in a demonstration on your own job!

ALLIS-CHALMERS

D-14 43-hp, 4,200-lb weight

D-17 63-hp, 5,300-lb weight

IT DOESN'T COST TO FIND OUT!

SOLD BY ALLIS-CHALMERS DEALERS EVERYWHERE

ALLIS-CHALMERS MFG. CO.

Utility Tractors and Equipment

Milwaukee 1, Wisconsin

Gentlemen:

Show me more about the new-design Allis-Chalmers utility tractors and equipment . . . TELL me how they can save me time and money!

Name _____

Firm _____

Address _____

City _____ State _____

C-4

ANNOUNCING LIMA'S NEW

...More than doubles the compaction production of

In only one pass, Lima's new Super Roadpacker achieves densities which require two or more passes to accomplish with any other multiple-shoe vibratory compaction unit! It's specially designed to meet the demands for high-production compaction on large construction jobs such as superhighways, air bases and earth-fill dams.

Even "tough-spec" materials can now be compacted on a production basis at speeds from 26 to 268 fpm—highway travel up to 24 mph. Two rows of six hydraulically controlled vibratory shoes can compact at varying widths up to 15 ft. High flotation tires; tandem rear driving wheels. Power brakes and power steering. Investigate. See your nearby Lima distributor today or write: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio, U.S.A.



Profit with single course construction; cut number of passes in half with new Super Roadpacker

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio
BALDWIN • LIMA • HAMILTON

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment



Super ROADPACKER

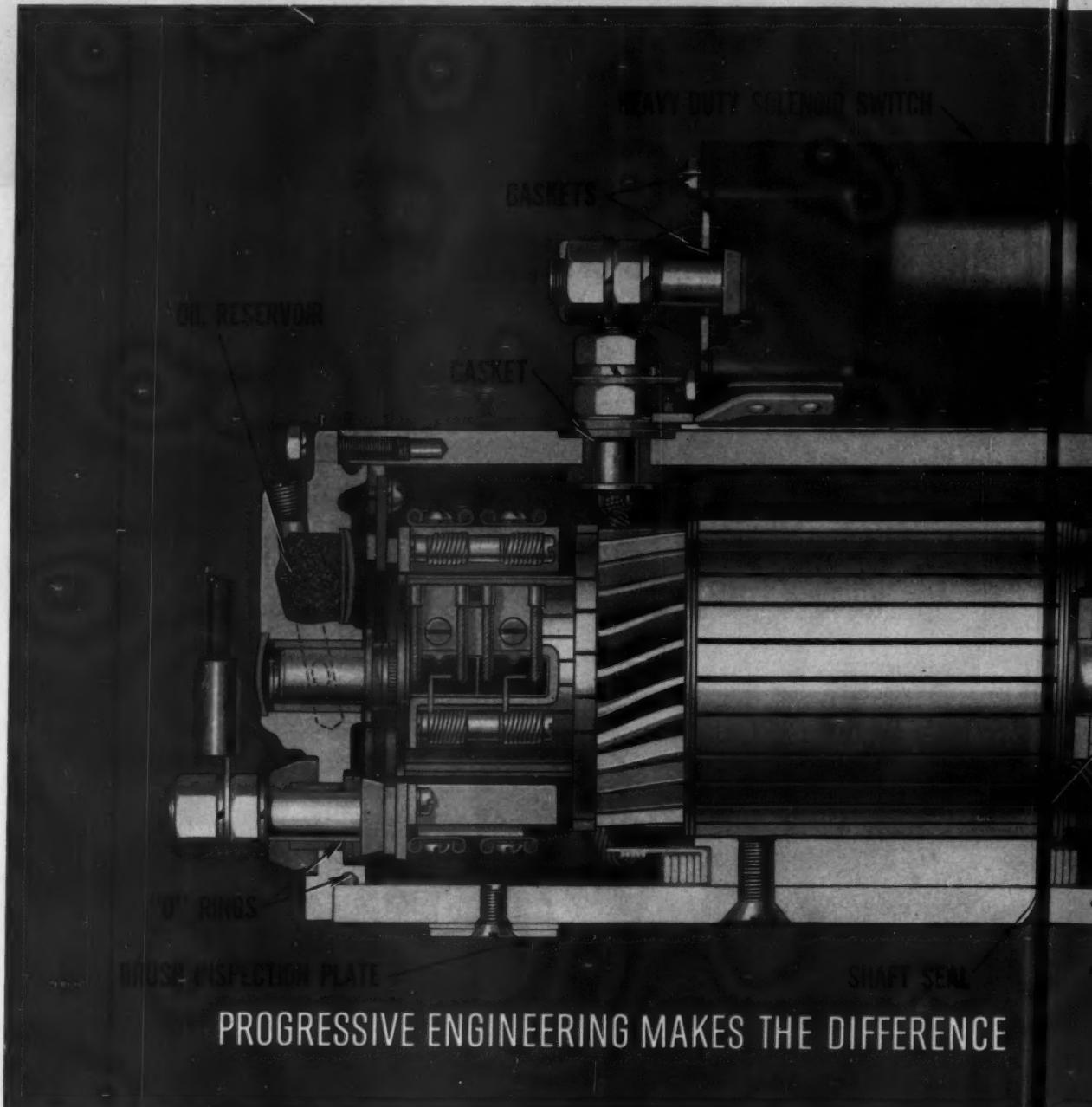
ion of any multiple shoe vibratory machine!



LIMA MODEL D ROADPACKER

For the job that does not require the Super Roadpacker, the Model D—with six vibratory shoes and variable working widths—will give fast, wide, deep compaction at speeds from 20 to 95 fpm—road speeds to 30 mph.





PROGRESSIVE ENGINEERING MAKES THE DIFFERENCE

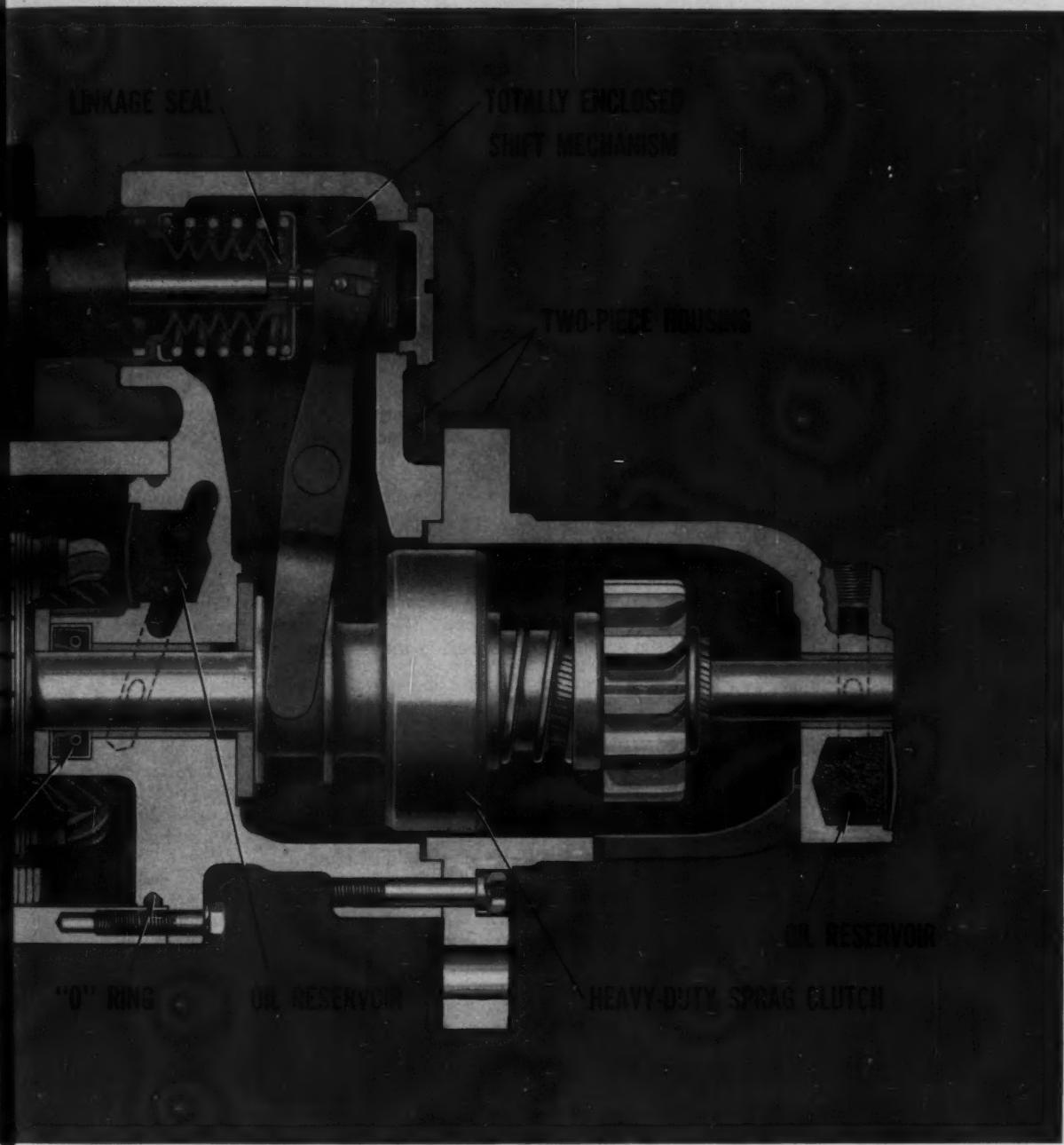
NOW FROM DELCO-REMY—NEW TOTALLY

Delco-Remy now offers a completely new series of solenoid-operated, over-running clutch type heavy-duty cranking motors with the shift mechanism entirely enclosed. Special two-piece drive housings can be assembled to permit a total of 24 different solenoid positions with respect to motor mounting. New 50% longer brushes, together with sealing rings (optional) and large oil reservoirs (optional), assure extra-long operating time between overhauls. And Delco-Remy design features keep these heavy-duty cranking motors positively engaged until the engine starts. Engine manufacturers are

invited to write directly to Delco-Remy for complete information and engineering assistance on the application of these new motors.

TOTALLY ENCLOSED DRIVE SHIFTING MECHANISM is protected against dirt, water, slush and ice. This enclosure plus the shaft seal and linkage seal also prevents transmission oil leakage.

TWO-PIECE DRIVE HOUSING DESIGN permits 24 different solenoid positions. Nose housings available in S.A.E. #2 and #3 mountings.



ENCLOSED HEAVY-DUTY CRANKING MOTORS

HEAVY-DUTY SOLENOID AND SWITCH provide positive pinion engagement and safely handle maximum starting current. Special seals increase contact life.

SPRAG CLUTCH DRIVE operates with non-chamfered ring gear. Pinion indexes on spiral spline, positively engages ring gear before power switches on, and does not become disengaged with sporadic engine firing.

HEAVIER BRUSH INSPECTION PLATES resist damage from use and handling—are sealed to prevent leakage to motor interior.

GENERAL MOTORS LEADS THE WAY—STARTING WITH

Delco-Remy



ELECTRICAL SYSTEMS

DELCO REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

Designed for today's concrete placement techniques

Uni-Form Panels have changed over the years to keep pace with modern concrete forming practice.

Today's Uni-Form Panels weigh a little more (about $\frac{1}{2}$ lb. per foot) than other pre-fab form panels because *they are designed and built to meet today's requirements.*

We know that if the assembled concrete form is to have the structural rigidity necessary to withstand today's concrete placement techniques and high rates of pour, the individual panels which make up the form must have great inherent strength.

We produce the strongest form panel we know how to build. The great strength—and extra weight—of Uni-Form Panels is due almost entirely to the special "T" section steel frame which supports the struts or load bearing members of the panel.

Most specification concrete does not permit deflection in the forms. If the form panel does not have the strength to take the stresses imposed by normal concrete construction practices, it is a liability that can cause serious problems.

Uni-Form Panels are designed to take the full strength of the tie, plus a wide safety factor to avoid any possible deflection or permanent set in the load bearing member. Concrete formed with Uni-Form Panels will be straight and true.

Because they are so strong, you don't have to "baby" Uni-Form Panels. You *don't have to make major changes in your method of handling and placing concrete.* You can apply the heaviest practical pressures and highest pouring rates to a Uni-Formed concrete form with assurance that it will stand up and take it.

When you rent or buy any pre-fab form, it will pay you to consider carefully what you're getting. If you want a panel that is built to give you maximum forming speed, economy, efficiency, and service life—look to Uni-Forms. More contractors are using them every day because Uni-Forms deliver where it counts . . . on the job.

Write for the UNI-FORM Panel Catalog. It contains complete details on the industry's most modern and flexible concrete forming system.

UNIVERSAL FORM CLAMP CO.

1238 N. KOSTNER AVENUE • CHICAGO 51, ILLINOIS

BRANCH OFFICES and WAREHOUSES:

ATLANTA BALTIMORE CLEVELAND HOUSTON
LOS ANGELES SAN LEANDRO TORONTO



New Ford Industrial Tractor with Super-Duty Loader

LOAD WITH FORD You'll Be a One-Man *Work* Gang!

- Full length load-carrier frame.
- 7000 lb. capacity "H" beam front axle assembly.
- 11,000 lb. capacity grille-bumper.
- 172 cu. in. "Red Tiger" engines, gasoline or diesel.
- Choice of transmissions including "Select-O-Speed."
- Full hydraulic power steering.
- "Third hand" foot throttle.
- Tire and wheel options for every job.
- Loader uses equipment hydraulic system; 3-point hitch system free for other attachments.
- $\frac{5}{8}$, $\frac{3}{4}$ and 1 cu. yd. tread width buckets.
- 2500 lb. lift capacity; 5500 lb. breakaway.
- Cushioned seat with back rest; wide open visibility.
- Exclusive bucket position indicator.

Ford Motor Company



New Ford Industrial Tractor with 12 ft. Backhoe

DIG WITH FORD

You'll Be a One-Man *Work* Gang!

- Choice of Ford 10 ft., 12 ft., 14 ft. Backhoes.
- Rugged construction, exclusive design for superior performance on any digging job.
- Backhoes use tractor's equipment hydraulic system; quickly attached or detached to free 3-point hitch.
- Clamp-type hitch; no pins or bolts.
- Cushioned seat with back rest; wide open visibility.
- Wide 10' stabilizer work stance; 77" transport width.

- Superior reach, digging depth, undercutting, truck loading with all models.
- Many buckets; unmatched capacity.
- Full-power 185° swing.
- No delays, no wandering in swing system.

These of course are only highlight features. See Ford, try Ford at your dealer's, or for detailed specifications write Industrial Tractor and Equipment Department, Ford Motor Company, Birmingham, Michigan.

Ford Motor Company



SPENCER

POWDER MONKEY

Capacity..... 300 pounds of Spencer
N-IV Ammonium Nitrate.

Output..... Will place 150 pounds in
two minutes.

Pressures..... 15 to 85 psi.

Air Compressor... 105 to 125 c.f.m.

(Larger Sizes Available)

One man is all it takes to fill horizontal holes with Spencer N-IV Ammonium Nitrate for blasting, when

you use the new Spencer Powder Monkey. Available with wheels for towing, or mount on powder truck.

At Last! A Machine For Fast, Easy Placement Of Ammonium Nitrate In Horizontal Blast Holes:

New Spencer Powder Monkey saves you \$3.00 to \$4.00 per 100 pounds on bag costs alone!

Scientifically designed for placement of Spencer N-IV Ammonium Nitrate in horizontal blast holes, the Spencer Powder Monkey *blows* the prills into the hole. Then the Powder Monkey is filled with sand, which is blown into the holes for stemming.

There's no need for tamping bags, tamping equipment, or the labor needed to fill and tamp bags into the hole!

With the Powder Monkey, you can actually load faster and more economically than with any other known method! Job-tested on holes ranging from 1½ inches to 8 inches in diameter, the Powder Monkey has proved itself under a wide variety of conditions.

Another advantage of placing Spencer N-IV with the Powder Monkey is that you can prime the entire charge with detonating cord at the same time you insert the hose in the blast hole for filling.

**World's Most Efficient
Low-Cost Explosive**

Spencer N-IV Ammonium Nitrate produces a superior blast for two reasons: (1) Spencer N-IV has a special structure that lets the prills absorb oil more easily. (2) Spencer N-IV contains a much higher percentage of ammonium nitrate than other brands.

Because of these two advantages, Spencer N-IV produces more energy than competitive grades of ammonium nitrate, yet costs no more!

How N-IV Reduces Priming Costs

With Spencer N-IV, you save on priming costs, too, because it can be initiated with a single strand of 175-grain detonating cord. And you put an end to the danger of storing high explosives on the job site!

Spencer N-IV is available in all-plastic 50-pound bags that are tougher than paper—so tough they reduce breakage as much as 50%. They are so weather-proof you can

store them right out in the open!
(Also available in paper bags.)

For more information on Spencer N-IV Ammonium Nitrate, or the new Spencer Powder Monkey, tear off and mail the coupon below:

SPENCER

Spencer Chemical Company
409 Dwight Building
Kansas City 5, Missouri

Yes! I want to know more about:

- Spencer Powder Monkey
 Spencer N-IV Ammonium Nitrate

Please rush information

Name _____

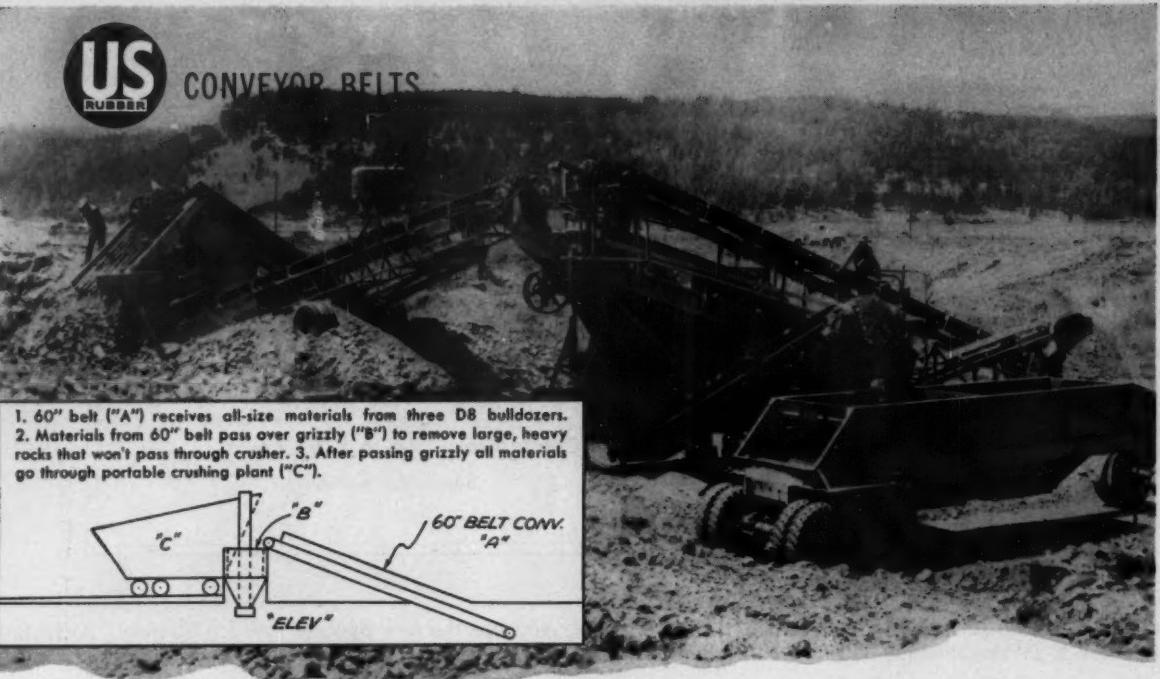
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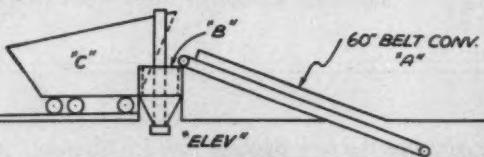
City _____ State _____



CONVEYOR BELTS



1. 60" belt ("A") receives all-size materials from three DB bulldozers.
2. Materials from 60" belt pass over grizzly ("B") to remove large, heavy rocks that won't pass through crusher.
3. After passing grizzly all materials go through portable crushing plant ("C").



Conveyor equipped with U.S. Matchless Belt increased production from 175 tons to 300 tons per hour

Such records as this have made U.S. Rubber the world's largest producer of conveyor belts.

In this instance the "U. S." Belt helped increase production at the Carlson-Lien Company (Piedmont, S.D.), a supply firm currently producing road-building crushed rock and delivering it to highway projects. The belt is 60" wide, 35 feet from center to center (78 feet overall). "Our intention," says Bruce Lien, company secretary-treasurer, "is to replace all belts with U. S. Rubber Belts."

In this operation, bulldozers push the rocks to be processed into the loading point. The conveyor belt then carries this material to the grizzly. The belt was designed to withstand direct loading by bulldozers. The impact of the large rocks falling directly on the belt does not damage the conveyor system. This permits the grizzly to be placed at the discharge end of the conveyor instead of at the feed point as in conventional installations.

The superiority of this belt not only helped speed up and increase production, but also eliminated the need for three or four men to laboriously remove large rocks that would damage a belt of inferior quality. The "U. S." Belt proved so efficient in tons moved per hour that another bulldozer was added to keep the loading pit stocked with raw materials. "The belt will pay for itself on this one job. We recommend it to anyone," says Bruce Lien.

When you think of rubber, think of your "U.S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.



Close-up of 60" U.S. Matchless® Belt carrying rocks from raw material pit up incline to crusher.

This installation was handled by "U.S." Distributor W. S. Nott, Minneapolis

Mechanical Goods Division



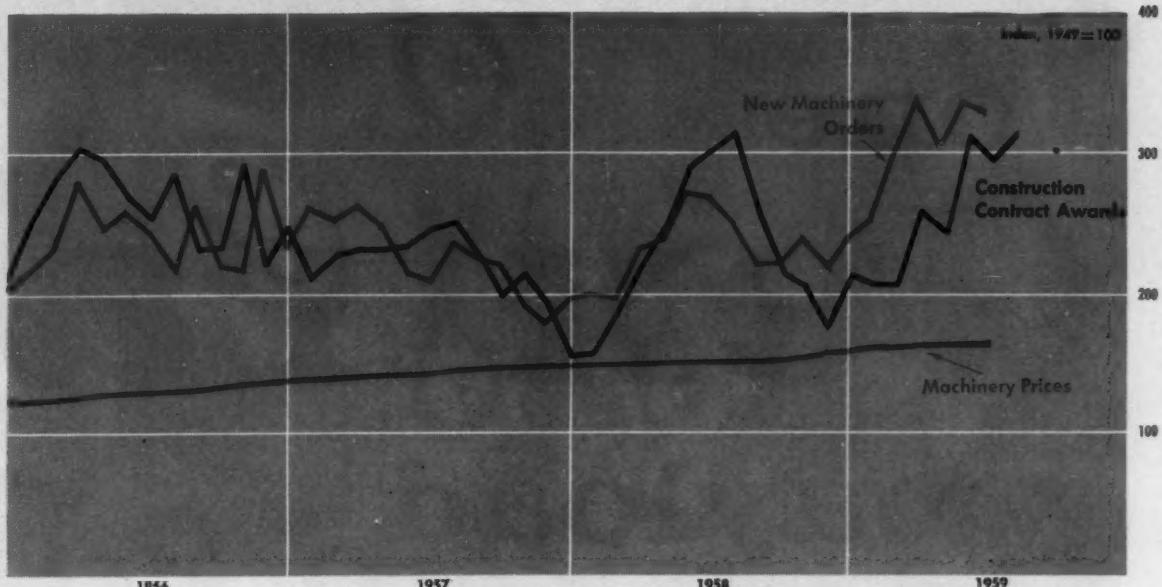
United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y.

In Canada: Dominion Rubber Company, Ltd.

Trends in the Machinery Market



Price Index

	JUNE 1959	MONTH AGO	YEAR AGO	% CHANGE 1958-1959
All Types of Equipment	172.1	171.9	165.5	+ 4.0
Cranes; Draglines, Shovels	188.4	183.8	183.8	+ 2.8
Shovel, ½ cu yd	163.3	163.3*	154.0	+ 6.0
Shovel, 34 cu yd	172.5	172.5	167.7	+ 2.9
Shovel, 1-1½ cu yd	180.5	180.5	178.4	+ 1.2
Shovel, 2-2½ cu yd	162.1	162.1	154.4	+ 5.0
Shovel, 3-3½ cu yd	167.8	167.8	162.7	+ 3.1
Shovel, 6 cu yd	188.2	188.2	180.1	+ 4.5
Crane, truck mounted	165.7	165.7	164.2	+ 0.9
Crane, tractor mounted	135.1	135.1	135.1	0
Bucket, clam shell	157.5	157.5	152.7	+ 3.1
Bucket, dragline	169.3	169.3	180.8	- 6.4
Scrapers and Graders	185.7	185.7	188.8	+ 4.3
Scraper, 4 Wheel, 8-10.5 cu yd	155.0	155.0	155.0	0
Scraper, 4 Wheel, 12-15 cu yd	156.8	156.8	151.3	+ 3.6
Scraper, 2 Wheel, 15-19.5 cu yd (a)	123.7	123.7	122.7	+ 0.8
Grader, heavy duty	172.6	172.6	164.0	+ 5.2
Grader, light & medium	171.1	171.1	161.2	+ 6.1
Tractors (non-farm, incl industrial)	188.2	187.8	188.5	+ 4.3
Wheel-type, off highway (a)	128.2	128.2	128.4	- 0.2
Crawler-type, 50-74 dhp	191.9	191.9	182.6	+ 5.4
75-99 dhp	196.4	196.4	185.8	+ 5.0
100-154 dhp	191.3	191.3	186.7	+ 2.5
180 dhp and under	204.8	201.3	191.8	+ 6.4
Machinery, Tractor Mounted	168.6	168.6	161.7	+ 4.3
Dozer, cable controlled	154.4	154.4*	151.7	+ 1.8
Dozer, hydraulic controlled	186.6	186.6	177.3	+ 5.2
Cable power control unit	151.4	151.4	147.9	+ 2.4
Loader, shovel type	161.5	161.5	153.9	+ 4.9
Specialized Machinery	153.1	153.1*	150.7	+ 2.9
Ditcher	156.6	156.6	154.1	+ 1.6
Roller, tandem	209.8	209.8	193.2	+ 8.6
Roller, 3 wheel	170.2	170.2	161.6	+ 5.3
Ripper and rooter	150.5	150.5	143.3	+ 5.0
Dewatering pump, 10 M gph	110.0	110.0	111.7	- 1.5
Dewatering pump, 90 M gph	149.5	149.5	144.3	+ 3.6
Portable Air Compressors	187.3	187.3	198.1	+ 5.3
Contractor's Air Tools	181.8	181.8	184.5	+ 10.4
Mixers, Pavers, Spreaders	155.9	155.8	149.0	+ 4.6
Mixer, portable, 11 cu ft	165.0	164.1	160.1	+ 3.1
Mixer, portable, 16 cu ft	169.8	168.9	163.7	+ 3.7
Mixer, truck, 6 cu yd	131.1	131.1	127.3	+ 3.0
Mixer, paving, 34 cu ft	192.0	192.0*	185.2	+ 3.7
Concrete finisher & spreader	191.5	191.5	173.0	+ 10.7
Bituminous distributor	122.3	122.3	122.4	- 0.1
Bituminous spreader	170.2	170.2	160.3	+ 6.2
Bituminous paver	162.6	162.6	153.0	+ 6.3
Off-Highway Trucks, Wagons (b)	101.1	101.1	99.9	+ 1.2
Contractors off-highway truck (b)	101.4	101.4	99.9	+ 1.2
Trailer dump wagon (b)	101.4	101.4	100.0	+ 1.4

* January, 1955=100 • b January, 1958=100 * Revised
BLS Primary Market Price Indexes, U.S. Department of Labor, 1947-49=100

Machinery Orders Hold At High Level

FOR THE FOURTH consecutive month orders for construction equipment set a new record in June.

The Construction & Mining Machinery New Orders Index was 329 in June, according to the McGraw-Hill Economics Department. This was only a whisker below May, revised upward a few points to 336, based on 1949=100. Compared to a year ago, June orders were up 21%. The first six months of this year tops 1958 by a thumping 31%. It is also running 21% above the previous first half record set in 1951.

Equipment prices held steady in June, on the average. The Bureau of Labor Statistics index of manufacturers' prices was 172.1 on June 15. This means that prices were only 0.1% higher than on May 15, but they averaged 4% above a year ago.

The only changes in the June BLS price indexes were a 1.5% increase on crawler tractors in the 155-180 dhp size and a 0.5% rise in concrete mixers of 11 cu ft and 16 cu ft capacity.

Though most types of construction equipment increased by less than 6% during the 12 months ending June 15, prices rose more than 10% for paving breakers and concrete finishers and spreaders.

The record investment in new equipment so far this year reflects the sharp rise in contractors' new business. Construction contracts reported by CM&E shot up to a weekly average of \$496.5 million in July. This matches the all-time high for July, scored last year, and lifts the Contract Award Index to 316, based on 1949=100.

Contract volume for the first seven months of this year total \$12,830 million. This is 6% more than a year ago and only 3% under the 1956 record.

one
extra
payload
in every 3 hauls!



These rugged aluminum dump bodies take the beating of hauling 13½ tons of 375° asphalt.

Mr. A. J. Osborn, manager of Northwest Asphalt Company, and one of his drivers who now haul as much payload in three trips as ordinarily carried in four.

Aluminum dump bodies speed work cycles—loads are freed and dumped quickly and easily.

REYNOLDS

Watch Reynolds TV show—"WALT DISNEY PRESENTS"—



Hauling hot and heavy asphalt, Truckweld dump bodies of Reynolds Aluminum pay-off within a year!

Aluminum dump bodies weigh only half as much as steel. Because of this, more payload can be carried — as witness the figures maintained with aluminum bodies fabricated by Truck Equipment & Welding Company of Seattle, Washington and used by Northwest Asphalt Company, Seattle.

Using an aluminum 12-foot bed on six wheel trucks, Northwest Asphalt has increased their payload from 10 tons to 13½ tons . . . a 35% payload increase. And these rugged aluminum bodies take the punishment of loading bumps and bruises—carry tons of 375° hot asphalt, day-in and day-out, without damage or abnormal wear.

Whether you haul asphalt, rock, sand, gravel — whatever the load — dump bodies of aluminum are well worth your consideration. Naturally the

extra payload story is most important. (So important, the premium cost of aluminum bodies can generally be paid off within the first year.) But there are other benefits, too.

There's a big maintenance-saving story with aluminum dump bodies. They won't rust, ever. They require no painting for protection. They're easily cleaned. They're virtually maintenance-free. Their light weight also cuts tire wear and increases gas mileage, especially on empty return trips. And consider the high scrap value of an aluminum dump body after years and years of use.

For names of aluminum dump body manufacturers or for further information, contact your nearest Reynolds sales office or write *Reynolds Metals Company, P.O. Box 2346-VG, Richmond 18, Virginia.*

ALUMINUM

every week on ABC-TV

The Finest Products
Made with Aluminum

are made with
REYNOLDS  ALUMINUM

Construction Business . . .

Machine Use and Labor Equivalents of Machine & Material Prices in 8 Nations

Reported by Polish Institute of Organization and Mechanization

I. Number of Machines: Total, per 1000 construction workers, (MCW) & per 1,000,000 pop. (mp)

	USA - 1955			Russia - 1956			West Germany - 1956			Poland - 1956		
	Total	per MCW	per mp	Total	per MCW	per mp	Total	per MCW	per mp	Total	per MCW	per mp
Shovel or "Scoop"	65,000	21	399	20,800	5.8	104	7,478	5.5	150	568	1.12	21
Bulldozers or "Pushers"	266,000	81	na	20,150	5.2	na	4,374	2.8	na	478	0.93	na
Cranes: stationary & mobile ..	na	na	na	32,250	na	na	5,598	4.1	na	818	1.6	na
Mixers: concrete	100,000	32	612	36,000	9.7	180	92,854	77.5	1,880	8,723	17.0	322

II. Price of Construction Machinery in Hours of Common and Skilled Labor

	Power Shovels (a)		Concrete Mixers & Medium Weight Machines (b)		Trucks, 5-Ton (c)				
	Rank	Common n-hours	Skilled w-hours	Rank	Common n-hours	Skilled w-hours	Rank	Common n-hours	Skilled hours
USA	(1)	10,800	7,800	(1)	1,200	900	(2)	6,300	4,500
Russia	(2)	28,500	12,600	(2)	2,500	1,100	(1)	5,700	2,500
W. Germany	(3)	29,000	20,500	(5)	4,100	2,900	(3)	15,000	10,500
Czechoslovakia	(4)	40,000	22,300	(4)	3,600	2,000	(5)	17,800	9,700
France	(5)	50,000	30,000	(3)	2,600	1,600	(4)	17,200	11,200
E. Germany	(6)	74,000	45,000	(7)	4,700	2,800	(7)	34,500	21,000
Austria	(7)	82,000	64,000	(8)	9,700	7,500	(8)	40,000	31,000
Poland	(8)	100,000	57,000	(6)	4,700	2,600	(6)	24,000	14,000

III. Price of Construction Materials in Hours of Common and Skilled Labor

	Bricks/M		Cement/ton (c)		Reinf Steel/ton (c)				
	Rank	Common hours	Skilled hours	Rank	Common hours	Skilled hours	Rank	Common hours	Skilled hours
USA	(1)	17	12	(1)	13	9	(1)	83	60
W. Germany	(2)	38	27	(4)	35	25	(3)	232	164
France	(3)	63	41	(6)	48	31	(5)	300	194
Russia	(4)	80	35	(3)	34	15	(4)	240	105
Austria	(5)	84	64	(8)	72	54	(8)	430	333
E. Germany	(6)	92	53	(5)	48	29	(7)	368	190
Czechoslovakia	(7)	96	54	(2)	30	17	(2)	205	114
Poland	(8)	158	90	(7)	63	36	(6)	355	203

(a) $\frac{1}{2}$ cubic meter. CM = 35.314 cf = 1.31 cy (b) 400-500 liters. 1,000 liters = 35.315 cf = 1.31 cy (c) Metric ton = 2,204.6 lb

Kiedy Oplaci się Mechanizować?

When Does It Pay to Mechanize?

WHEN does more construction mechanization pay off? Obviously, it depends on the relative cost of construction labor and construction equipment, says the Polish Institute of Organization and Mechanization.

Its comparative study of the use of equipment in four "socialist" and four "capitalist" countries shows that the United States leads in mechanization. For example, the U.S. has 21 power shovels (the Poles call them "scoops") per 1,000 construction workers compared with 1.12 in Poland. The U.S. has 81 bulldozers per 1,000 workers; Poland has 0.93.

The Institute also compares the use of construction machines in terms of machines per million population. This study shows that the U.S. has 399 "scoops" per million population compared with 21 in Poland. Thus, the U.S. is about 20 times as mechanized with power shovels as Poland, according to both the per capita figure based on construction workers and the figures based on total population.

But concrete mixers are more widely used than power shovels in Poland. There are 322 concrete mixers per million population there compared with 612 per million population in the U.S.

Equipment Economy Index

The Institute uses this index for measuring equipment economy:

$$\text{Index } k = \frac{C}{P} = n \text{ (or } w\text{)}$$

where C is price of machine

P is wages per hour

n is hours of common or

"unqualified" labor

w is hours of skilled or

"qualified" labor

This formula shows, for example, that it takes only 10,800 hours of common labor in the U.S. but 100,000 hours of common labor in Poland to pay for a power shovel.

continued on page 48



No. 955 excavates part of a total of 19,000 yd., preparing for base an area 20 ft. wide, 12-13 in. deep. Cuts are made by Cat No. 12 Motor Grader and windrowed. Job is part of a \$1,828,366 project by Gulf Bitulithic Co. on U. S. 75, to be part of the Interstate Highway System.



Says Operator F. H. Leggett: "I can move over 100 cu. yd. a day more with the side dump than with other loaders. It doesn't spill dirt because you don't have to jockey for position. A Traxcavator is easy to operate and I'm less tired at night. It's the best on the market."



Weather bad... No. 955 terrific... job on schedule!

Bad weather cut work days during the first six months to 20 per cent, but the highway project stayed on schedule. Reason: a Caterpillar No. 955 Traxcavator with Side Dump Bucket.

Gulf Bitulithic Co., Houston, Texas, first tried a drag line on a 2½-mile widening job on U.S. 75 at Conroe, Texas. Production was poor in the shallow cut. Switching to a No. 955, five-yd. trucks were loaded in an average time of three minutes; four buckets to the truck.

"We increased production 25 per cent," says Superintendent Thomas "Red" Brown. "I like that Side Dump Bucket. You can't beat it!"

In-line loading of trucks with the Side Dump Bucket paid off in less traffic congestion on the busy highway, and it also avoided tearing up the subgrade with twisting and turning.

Side Dump Buckets are available on all three Traxcavators: No. 977 (2¼ cu. yd.), No. 955 (1½ cu. yd.) and No. 933 (1½ cu. yd.). Other buckets, teeth, 'dozers and forks help make a Traxcavator the most versatile excavator-loader.

Ask your Caterpillar Dealer to demonstrate on your job how a Traxcavator can make money for you. He stands behind every machine he sells with round-the-clock service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE



THESE CP TRACDRILLS AND ROTARIES STAYED ON THE JOB 20 HOURS A DAY- 7 DAYS A WEEK -AT 50° BELOW

Straight through the worst of winter, CP Tracdrills and CP "Power Vane" Rotary Compressors served 'round the clock on one of the world's toughest construction projects. The CP Tracdrills sank 2-3/4" blast holes through permafrost and solid rock . . . and despite the rutted, frozen ground and the mud caused by quick thaws moved easily from hole to hole. CP Rotary compressors wearing "overcoats" in the form of portable shelters delivered hundreds of hours of dependable trouble-free service throughout the job. You too, can put any CP Compressor and any CP Tracdril to work under your toughest conditions and forget your thermometer and your clock. You know that all CP construction equipment is *built to boost contractor profits*. See your CP equipment distributor!

Three CP-600 "Power Vane" Rotary Compressors like this one, powered by a 6-71 Diesel engine, supplied air for drilling operations.



NEW HARD HITTING CP-69 SINKER DRILL



This new 55-pound class sinker drill is ideal for secondary drilling. Exceptionally well balanced, it has plenty of hitting power to make it a hard working down-hole drill and a fine performer on airleg work as well. New type "Beavertail" retainer eliminates retainer springs—improves steel retention and reduces steel breakage. Retainer can be rotated 180° for airleg work. Has all-purpose backhead for blower-dry, wet and automatic air-water operations. Write for complete data on the new CP-69 Sinker.

This bleak shot shows CP Tracdrills and the terrain they worked on the sub-zero project. Portable shelters in the background house CP "Power Vane" Rotary Compressors that supplied air with never a stop for service.



Chicago Pneumatic

AIR COMPRESSORS • ROCK DRILLS • PUMPS • IMPACT WRENCHES • VIBRATORS • TAMPERS • DIESEL ENGINES

CONSTRUCTION BUSINESS..
continued from page 44

But note that it takes only 2,500 hours of skilled labor in Russia and 4,500 hours in the U.S. to pay for a 5-ton (metric) truck. The report says the reason for this is that the prices of trucks are fixed at exceptionally low levels in Russia. For example, a $\frac{1}{2}$ cubic meter power shovel in Russia costs five times as much as the 5-ton truck. In the U.S. and most other countries, the shovel costs only about twice as much as the truck.

The report makes the proposition that mechanization pays off most where wages are very high and mass-produced, competitive equipment prices are low.

Materials Priced in Hours

The report also converts materials prices into hours to compare costs among eight nations.

It takes 9 hours of skilled labor in the U.S. but as much as 54 hours in Austria to pay for a metric ton of cement (2,205 lb.). A metric ton of reinforcing steel costs 60 hours of skilled labor in the U.S.; it costs 333 hours in Austria.

Regional Trends in Construction Contracts—First Half 1959

Reported by CM&E (in millions of dollars)

Region	Total	State & Municipal	Federal	Private
CONTRACT VOLUME				
US Total	\$10,347.8	\$3,750.0	\$1,566.2	\$5,031.6
New England	636.5	244.1	60.5	331.9
Middle Atlantic	2,396.8	683.8	133.0	1,580.1
South	1,734.3	713.2	348.1	673.0
Middle West	1,757.2	641.8	171.8	943.6
Miss. R. to Rockies ..	2,125.9	841.4	414.0	870.5
Far West	1,697.2	625.8	438.8	632.6

PERCENTAGE CHANGE, '58-'59

US Total	+ 7.5	- 6.2	+ 7.5	+20.6
New England	+ 3.9	+11.8	-44.7	+16.4
Middle Atlantic	-11.3	-33.4	-32.8	+ 7.6
South	+44.3	+35.8	+22.3	+71.9
Middle West	+ 0.3	-16.8	+41.7	+ 9.7
Miss. R. to Rockies ..	+11.2	+ 7.0	+ 1.6	+21.1
Far West	+17.4	- 5.3	+30.4	+41.0

South Leads in Contract Gain

Heavy construction contractors signed up 44% more work in the South the first six months of this year than in the same 1958 period. This is far greater than the 7.5% gain for all of the U.S.

Booming private and public work explain why the South is

outpacing the rest of the country in the 1959 rate of growth. Private construction awards are up 72%, according to CM&E figures. State and local public works racked up a 36% gain, and federal contracts are 22% above 1958.

continued on page 50

81 hydraulic models to choose from!

THE WORLD'S MOST COMPLETE LINE



STANDARD HYDRAULIC JACKS

11 Models
1½ to 100 tons capacity
 $5\frac{1}{4}$ " to 22" travel



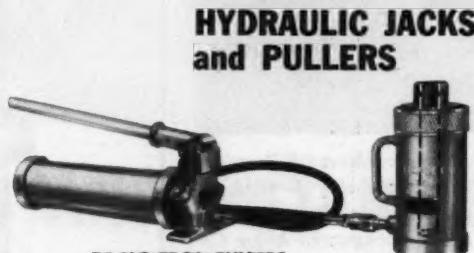
"JENNY" CENTER-HOLE HYDRAULIC PULLERS

6 Models
30 to 100 tons capacity
 $3\frac{1}{2}$ " to 10" travel



ROL-TOE FOOT-LIFT HYDRAULIC JACKS

3 Models
10 to 50 tons capacity



SIMPLEX

HYDRAULIC JACKS and PULLERS

RE-MO-TROL PULLERS

Solid and Center-Hole Rams
39 Models
10 to 300 tons capacity

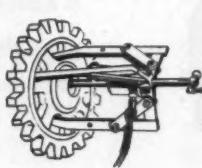


HAND PUMPS
3 Models



HYDRAULIC SERVICE and BUMPER JACKS

9 Models
1¼ to 20 tons capacity
13½" to 19" travel



HYDRAULIC PULLERS

4 Models
20 and 30 tons capacity
Push-Pullers, Double and Triple-Grip Pullers



POWERED PUMPS ELECTRIC, GAS OR AIR - 6 Models

Look for further information on Lever and Screw Jacks in other advertisements.

TEMPLETON, KENLY & CO.
2509 Gardner Road
Broadview, Illinois



Booms reach skyward as five of Leake & Nelson's Moto-Cranes keep construction on schedule. A sixth Lorain, a crawler hoe (in left background), works on the foundation drainage system. Leake & Nelson Co., Inc. has purchased 17 Lorains.

FIVE LORAIN MOTO-CRANES ERECT NATION'S LONGEST PRECAST CONCRETE ARCHES

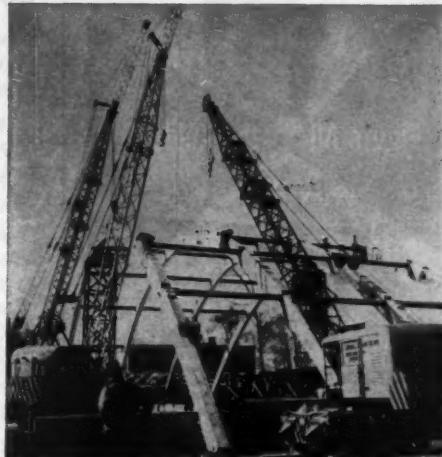
At Fairfield University in Connecticut, five husky Lorain Moto-Cranes owned by Leake & Nelson Co., Inc. of Bridgeport, Conn., help build a unique new gymnasium. Supports for the structure consist of eleven, three-hinged, parabolic, reinforced concrete arches that measure 160 feet between the base hinges, and rise to 40 feet at the crown hinge. E&F Construction Co., Inc., of Bridgeport, a 13-time Lorain owner, is the prime contractor.

The arches were erected in half sections with each lift weighing 26 tons. Here's where Moto-Crane balance, mobility and precision control paid off.

Today's pace setting, big jobs call for reliable Moto-Crane performance. Lorain dependability is backed by 40 years' experience in building rubber mounted cranes. Progressive contractors know that Moto-Cranes get to the job faster, finish the job quicker.

For details, see your Lorain distributor.

THE THEW SHOVEL COMPANY, LORAIN, OHIO



Big live loads require a rugged carrier—the kind Lorain builds for its Moto-Cranes. Designed to withstand the torsional stresses of heavy-duty service, these bigger, heavier carriers increase Moto-Crane output.

LORAIN® ON THE MOVE

PLANTS in Lorain, Elyria and Bucyrus, Ohio.

PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawler mountings from $\frac{3}{8}$ - to $2\frac{1}{2}$ -yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in $1\frac{3}{4}$ - and 2-yard models.

OUTLETS—Lorain products sold and serviced by 249 distributor outlets throughout the world.

BUILT-IN RUST PROTECTION

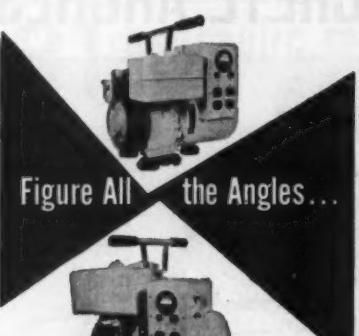


Blue Brute Air Tools give you a big money-saving feature—they resist rust and corrosion. The reason is an exclusive process: Blu-Coated Parts. With Blu-Coated Parts Worthington Air Tools operate better job after job and in damp atmosphere. They resist wear, seizing, galling. They hold oil better. Even after your toughest jobs you can store them for months without deterioration.

Blu-Coated and Worthington Distributor's Guaranteed Availability Plan keep your jobs going even if your tools are in for checkup or repair. GAP works this way: 1) bring in your Blue Brute tool for repair. While it's in distributor's hands he will, 2) lend you an air tool to keep your job going. See him for complete details, about Blu-Coated, GAP, and assured parts and replacements. 60-15



WORTHINGTON



and you'll specify **pm**
Electric Plants

Read how exclusive PM features put job pay-out dollars right back in your pocket!

- RPM indicator puts \$70 each 6 months in your pocket!
- Automatic spark advance puts \$60 every 6 months in your pocket!
- Pushbutton start puts \$30 per month in your pocket!
- Remote control puts \$30 per month in your pocket!

Write for free demonstration. There's a PM Field Engineer near you.

**Pacific
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14052 Burbank Blvd.
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Manufacturers of the Thomas Electronic Organ



Useful Information

These *Construction Methods* reprints contain valuable information for contractors.

BAILEY BRIDGING

75¢ each

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35¢ each, 10 or more, 25¢ each

CONTRACTORS' INSURANCE

25¢ each, 10 or more, 20¢ each

BLASTING AGENT

SLASHES POWDER COSTS

25¢ each

Send your request to:

Editor

Construction Methods

& Equipment

330 West 42nd Street

New York 36, N. Y.

CONSTRUCTION BUSINESS .. *continued*

Biggest heavy construction market is still in the Middle Atlantic—despite an 11% drop in first half awards.

The Mississippi to Rockies region is challenging the Middle Atlantic's lead. Though it has a \$275-million gap to close before it catches up, contracts are running 11% ahead of last year.

The Far West has forged 17% ahead of last year's six months volume, even though state and municipal contracts dipped. That's because private work and federal awards have jumped 41% and 30%, respectively, above 1958.

Weakness in state and local public works in the Middle West offsets a 42% rise in federal work and a 10% gain in private awards. Total awards for the first half are barely ahead of 1958.

New England, the smallest region, also has a small gain of 4%. A dropping off in federal construction has partly offset gains of 12% to 16% in other public works and in private projects.

SOME BIG CONTRACT AWARDS OF THE MONTH

Merritt-Chapman & Scott Corp., 261 Madison Ave., New York, N. Y., Peter Kiewit Sons' Co., 1024 Omaha National Bldg., Omaha, Neb., Raymond International, Inc., 140 Cedar St., New York, N. Y., and Tidewater Construction Corp., 538 Front St., Norfolk, Va. A joint venture to construct causeways, bridges, and tunnels for Chesapeake Bay Bridge-Tunnel Project between Little Creek, Va., and Kiptopeake, Va. Chesapeake Bay Ferry Dist. Comm., Box 120, Norfolk, Va. Construction is subject to sale of \$202,000,000 bonds. \$126,000,000.

Bechtel Corp., 22 Bush St., San Francisco, Calif. Construct 350 mi of 30-in.-dia pipeline in Tenn., Ill., and Ind. Mid-Western Gas Transmission Co., Tennessee Bldg., Houston 1, Tex. \$50,000,000.

Williams Construction Co., 12480 Paseo Cerro, Saratoga, Calif. Erect a shopping center in San Jose, Calif. Ronald Williams, 855 E. Camino Rd., San Palo, Calif. \$25,000,000.



SETTING ROOF STEEL (Texas): American 300 Series Truck Crane.



HOUSING PROJECT DUTIES (Michigan): American 300 Series Crawler Backhoe.

AMERICAN HOIST and Derrick Company

St. Paul 7, Minnesota

DERRICKS-HOISTS
to 800 tons

REVOLVER CRANES
to 400 tons

EXCAVATORS-CRANES
to 2 yds.-60 tons

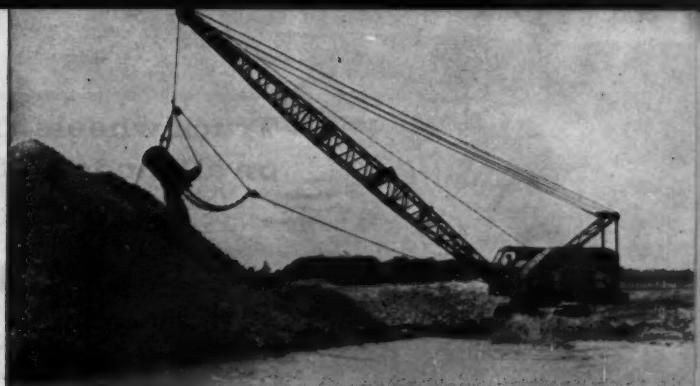
LOCOMOTIVE CRANES
to 130 tons

AMERICAN HOIST
PACIFIC COMPANY

Special materials
handling equipment

CROSBY-LAUGHLIN
DIVISION

Drop forged fittings
for wire rope-chain



CORAL & SHELL ROAD FILL (Florida): American 700 Series Crawler Clamshell.

PROFIT BY THE EXPERIENCE OF OTHER AMERICAN CRANE/EXCAVATOR OWNERS!

Owners and operators of American equipment can depend on "years-ahead" engineering features to assure them of efficient lifting and digging services. Their acceptance of American dependability and versatility is another reason why you'll see American cranes in use by more and more of the nation's leading construction men.

If you have expensive, single-duty equipment standing idle, now is the time you should fully examine the potential of multi-purpose American cranes and excavators. They can cover a wider variety of jobs than almost any other machine you own. Handling loads of all shapes and types, American cranes are tailor-made for work on every project. With interchangeable fronts . . . hooks, grapple, clamshell, dragline, shovel or magnet . . . the demands of every industry are met by a complete line of American Cranes and excavators. Based on the experience of other American owners and operators, Americans are job tested . . . job proven . . . job ready . . . to help you cut your construction costs.

Get the complete story on the American best suited for your needs.

SEND FOR FREE detailed and illustrated catalog information on American cranes and excavators.

AMERICAN HOIST AND DERRICK COMPANY

Dept. CM, St. Paul, Minnesota

Please send me FREE complete catalog information on American cranes and excavators.

Truck

Self-propelled

Crawler

Name _____

Firm _____

Address _____

City _____ State _____



Truck wheels, front idlers, support rollers
on all models of Allis-Chalmers crawler tractors

Lubricated at factory need no further greasing

Every Allis-Chalmers crawler tractor—whether produced today or any time during the past 17 years—offers its owner the twin secrets of permanent lubrication.

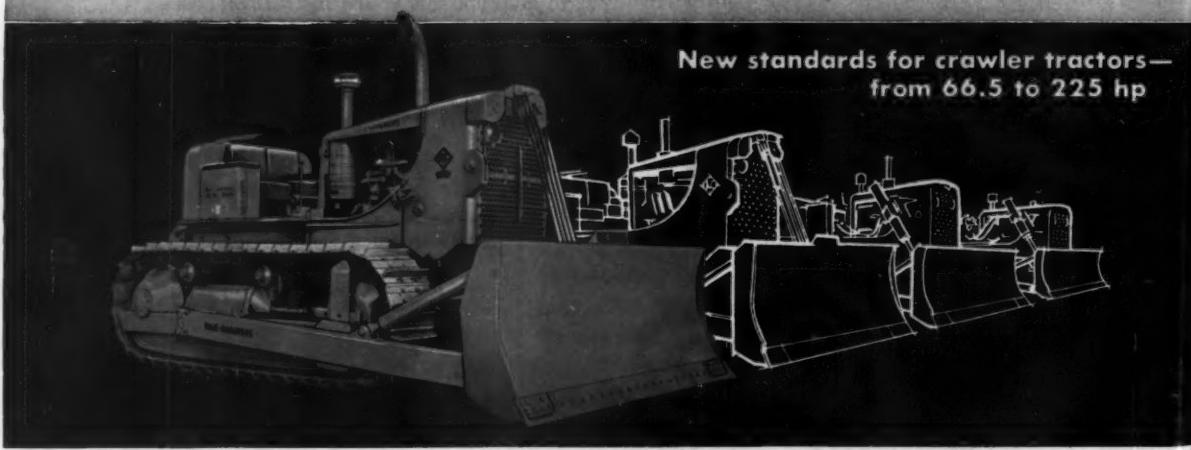
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Allis-Chalmers tapered roller bearing wheels roll much more freely than ordinary bushing types... reduce power-robbing friction... give you more of your engine's horsepower at the drawbar or moldboard where it pays off in production. The tapered roller bearings maintain precise alignment of all parts... protect the perfect seal by minimizing side thrust and wobble... eliminate the uneven wear that makes positive sealing of bushing-type assemblies impractical.

2
0000

The "Positive Seal" that makes permanent lubrication possible is effected by two steel sealing rings working in combination with the tapered roller bearings. These two rings, smoother than glass, are held firmly together by strong steel coil springs. One seal remains stationary; the other turns with the truck wheel. These seals are micro-finished to near perfect flatness. Their surfaces fit together so precisely that nothing can get through... a perfect seal.



New standards for crawler tractors—
from 66.5 to 225 hp

ORS
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Safe, permanent lubrication of truck wheels, front idlers and support rollers requires seals that will keep all moisture and other foreign materials out . . . the lubricant in. Only Allis-Chalmers offers seals which are positive because of their use in combination with tapered roller bearings. The Allis-Chalmers Positive Seal, tapered roller bearing design has been proved in the field through more than 20 years . . . through millions upon millions of operating hours. When introduced in 1938, this outstanding design replaced bushing-type assemblies similar to those used today in other tractors. Allis-Chalmers abandoned bushing-type truck wheels because, in its opinion, they could not be positively sealed.



Your Allis-Chalmers dealer will be happy to help you estimate the savings in time and material that are yours with Allis-Chalmers permanent lubrication. See him today. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

move ahead with ALLIS-CHALMERS 
...power for a growing world

proof of dependability



See this Demonstration!



Your Atlas Representative Can Show You Actual Performance of Unique Electric Match Contained Only in Atlas E.B. Caps

All Atlas Electric Blasting Caps are fired with tiny electric matches so dependable that the armed services use thousands of them in missiles and rockets.

You can prove for yourself how sure-fire Atlas caps really are. Your Atlas representative has an interesting test firing kit to show you. Pick a match at random from his stock and fire it yourself . . . see how it can be depended on to fire in your blast hole.

Your Atlas man can show you *why*, too. Every part of every Atlas match is pre-tested, and the match is completed by multiple dips in high quality flash compounds.

Your Atlas representative will be glad to show you this demonstration, and to help you use Rockmaster and regular Atlas E.B. Caps for dependable initiation and timing to get effective, economical blasting.

**ATLAS**
EXPLOSIVES
DIVISION
POWDER COMPANY
WILMINGTON 99, DELAWARE
Offices in principal cities

Write for your copy of the new 60-page Handbook of Electric Blasting by D. M. McFarland and Guy F. Rolland.

**NEW
3000-lb. capacity
CASE
TERRALOAD'R**

**does the work of
2 smaller rigs**



**73% more crowding power
gets heaped loads faster**

You've never seen anything to match the fast, smooth crowding action of the Case W-5. Parallel-circuit control-valve applies full power from 30 gpm pump to both lift and bucket-tilt cylinders at the same time. In addition, tilt cylinders use full piston area on break-out stroke, to produce a total breakaway force of 7800 lbs.—73% more than any competitive machine.

CASE®
J. I. CASE CO., RACINE, WIS.



**only
\$5975**

complete with 1-cu. yd. bucket,
F.O.B. factory, plus freight and
taxes. Price subject to
change without notice.

... Saves you up to \$1500⁰⁰!

Field tests prove the new 1-cu. yd. Case W-5 Terraload'r will load or stockpile as much material per day as *two smaller rigs*... with savings up to 25% in initial cost. Completely engineered, built and powered by J. I. Case, the rugged, 2-wheel-drive W-5, with rear-wheel power-steer, introduces new standards in break-out power... in machine balance... and in all-around ease of maneuverability. It is also available with interchangeable 1½-cu. yd. light material bucket, pallet fork, block fork and all-weather cab, to meet your most exacting requirements. See it in action today at your Case Industrial Dealer's, or mail coupon below for complete information.

Rush coupon for full details!

J. I. CASE CO., Dept. H1499, Racine, Wis., U.S.A.

Send catalog on new W-5 Terraload'r

I am also interested in:

Larger 4-wheel-drive unit

4000-lb. Fork Lift

Name Title

Company

Address

City State

C-TI-305



**World's most advanced line of wheel and crawler machines
for construction, earthmoving and materials handling**

NEW FRAM DOUBLE CARTRIDGE AIR FILTER GIVES DOUBLE SAVINGS!

*Cuts Cartridge Costs *Cuts Maintenance Costs



Now FRAM offers—for extremely dusty conditions—a new line of heavy-duty dry air filters with *precleaner* cartridges that give your engines complete dust protection—at great money savings!

These new filters utilize the famous FRAM "Filtronic" Cartridge with additional precleaner cartridge protection.

Tests show that *three of these inexpensive precleaners* can be used during the life of each FRAM "Filtronic" Cartridge! This means triple life for the main cartridge . . . fewer "Filtronic" cartridge changes . . . a new low in cartridge costs! This new filter is so efficient that even under abnormal dust conditions it assures long engine life . . . fewer engine overhauls.

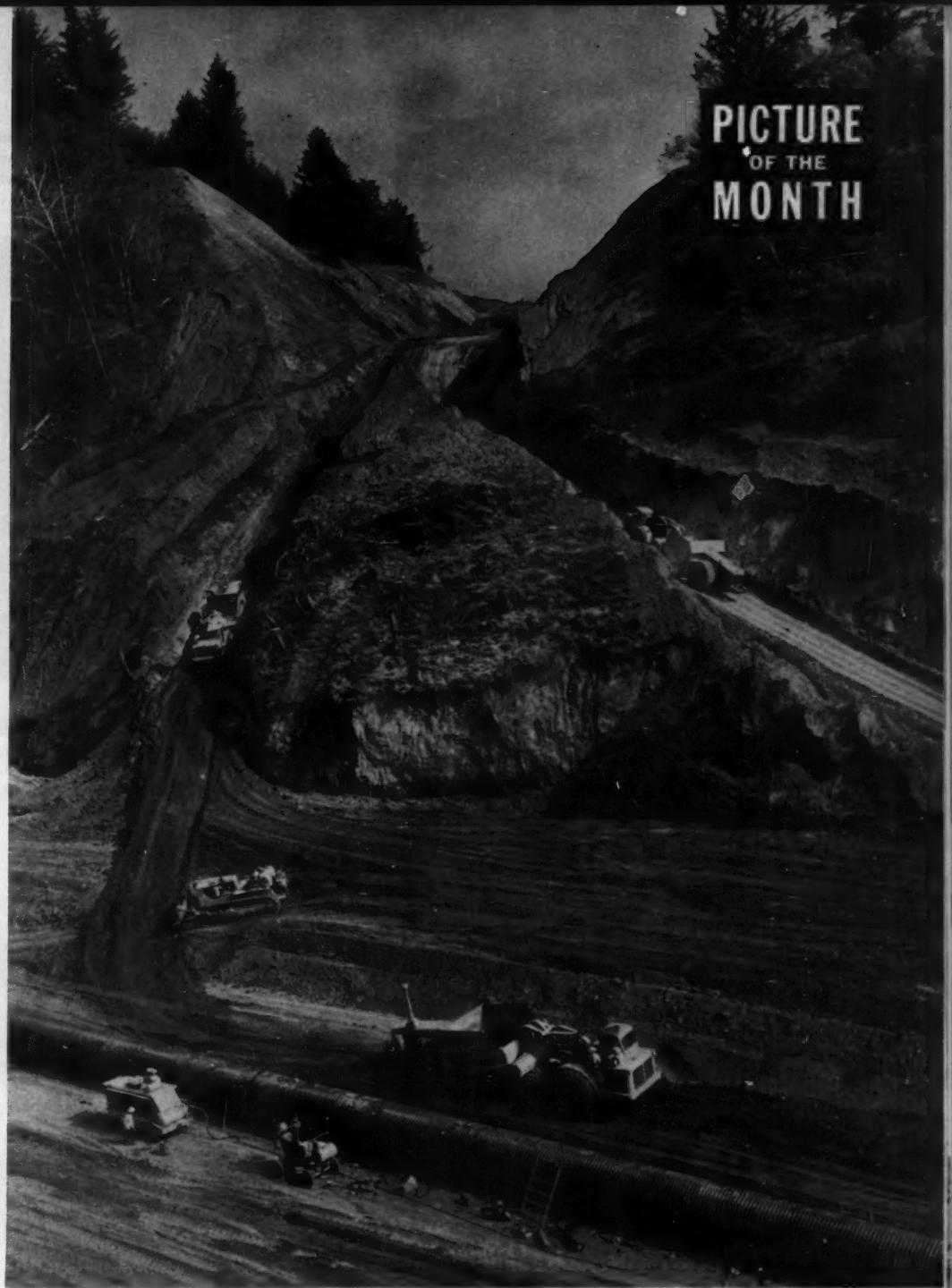
FRAM supplies a complete line of these heavy-duty filters—to meet air intake needs of engines requiring from 225 to 1000 CFM! For complete information, write FRAM CORPORATION, Providence 16, R. I.

HOW IT WORKS

- 1 Dirty air enters perforated grill.
- 2 It passes through precleaner cartridge which removes soot and fine dust.
- 3 Air then continues to inner main "Filtronic" cartridge which removes 99% plus of all other impurities.
- 4 Clean air then leaves the filter and enters the engine air induction system.



PICTURE
OF THE
MONTH



Rugged Road Building

• Two-engined Euclid scrapers work up and down a 40-percent grade to place fill for a highway near Brookings, Ore. The drainage pipe in the foreground rests on 150 ft of fill, and another 150 ft of fill is still to be placed. Morrison-Knudsen Co. will move a total of 4,500,000 cu yd of earth for this 3½-mi stretch of highway. There are seven big fills ranging up to 350 ft high and containing 500,000 to 750,000 cu yd of earth; cuts are from 200 to 300 ft deep. M-K has a fleet of 17 tractors and 11 scrapers at work on the job.



New International 560 handles backhoe buckets up to 8.9 cu ft, up to 2 feet wide . . . does own backfilling with front-end loader. Save expense of short-haul truck and trailer transport by self-powered job-to-job moves!

Backhoe-loader combination: International Pippin

1/3 cu yd bite ... on rubber!

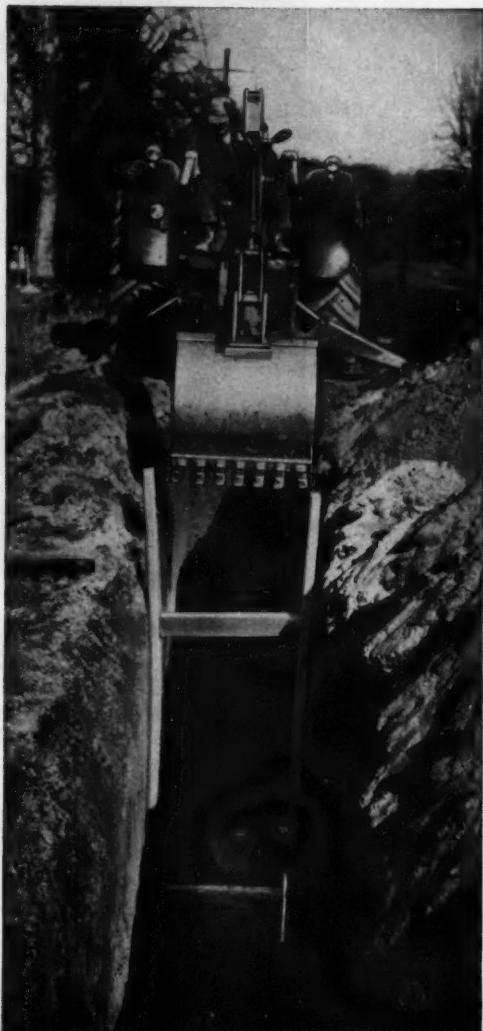
New International® 560 tractor

Put more than 3 tons of built-in brawn plus tremendous hydraulic down-pressure behind a $\frac{1}{3}$ -yard bucket . . . the 72.5 hp* International 560 delivers irresistible force for digging more than 13 feet deep on the toughest trenching assignments!

You match . . . even outdig . . . single-purpose machines because of job-to-job mobility to handle small-yardage jobs that higher-priced, specialized rigs can't afford to touch. You get double-duty from the husky gasoline, diesel or LP Gas power plant, too, with the big capacity front end loader.

Ask your IH dealer to demonstrate the big, burly 560 . . . or others in the complete International wheel tractor line, 13.4 to 90 hp*. For free catalog, or name of your IH Dealer, write International Harvester Co., Dept. CME-8, P. O. Box 7333, Chicago 80, Ill.

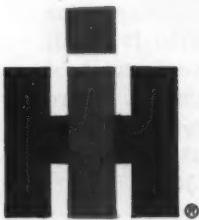
*Maximum flywheel hp



See your

**INTERNATIONAL
HARVESTER dealer**

International Harvester Products pay for themselves in use
—Farm Tractors and Equipment . . . Trucks . . . Commercial Wheel
Tractors . . . Motor Trucks . . . Construction Equipment—General
Office, Chicago 1, Illinois



Some useful tricks in pile-driving

Here are ingenious solutions to the problems of driving 60' long, 12" H-piles for bridge piers, in an area where soft ground made it necessary to eliminate driving guides so as to reduce weight. The rig consisted of a Lima crane and Vulcan #1 hammer, with a Jaeger 600 cfm rotary air compressor to supply the wallop.

1: USE CAGE TO STABILIZE FREE-HANGING HAMMER:

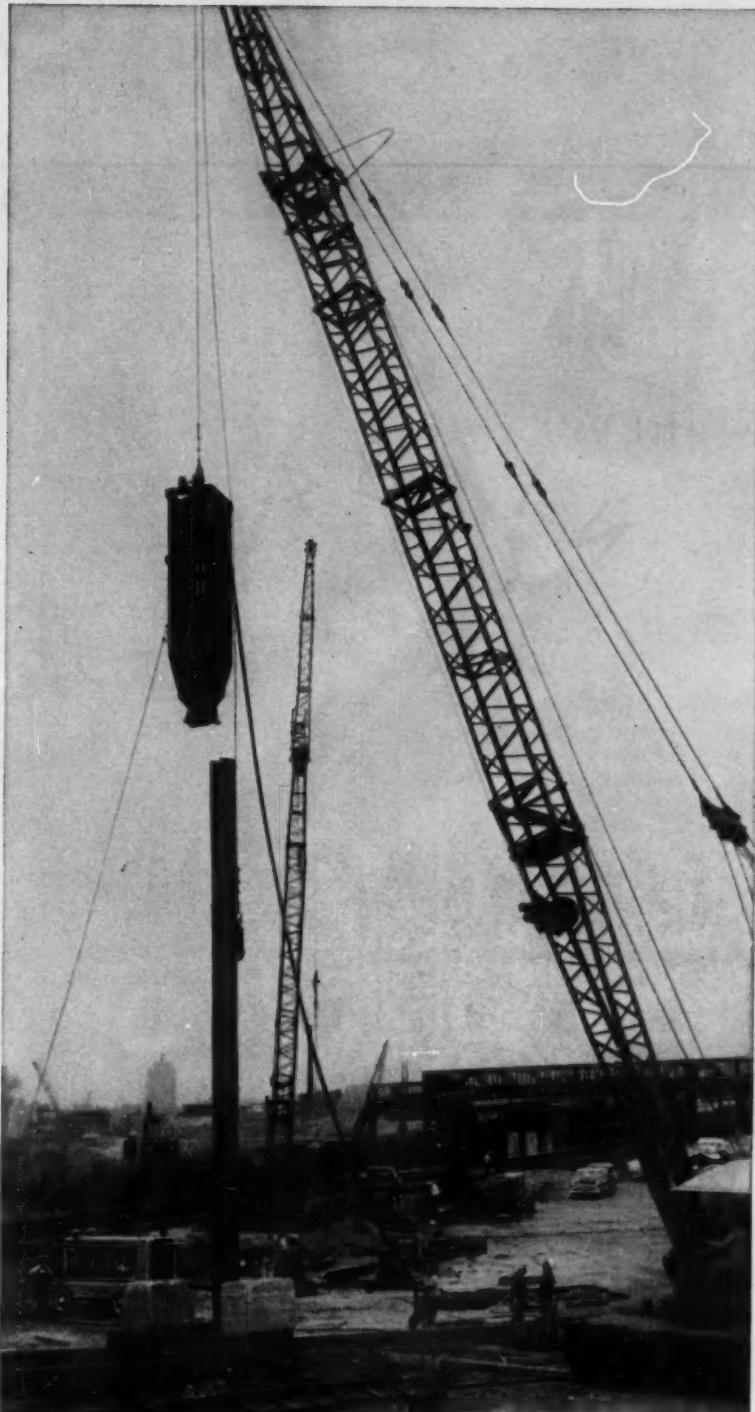
Weight of heavy pile driving guides was eliminated by enclosing the hammer in a cage equipped with a collar to slip over the top of the pile.

2: POSITION PILES WITH NOTCHED BEAMS, HELD BY BLOCKS:

Piles were placed between two beams laid across long members spanning the pile pit and held by large concrete blocks. Steel bars in the beam notches maintain correct alignment.

3: WHEN A BATTER IS DESIRED, USE FREE HAMMER TO TILT PILE:

Weight of hammer, on top of pile, tilts pile to desired angle while bars hold lower end of pile in place.



4: USE STEADY, LOW-COST JAEGER AIR

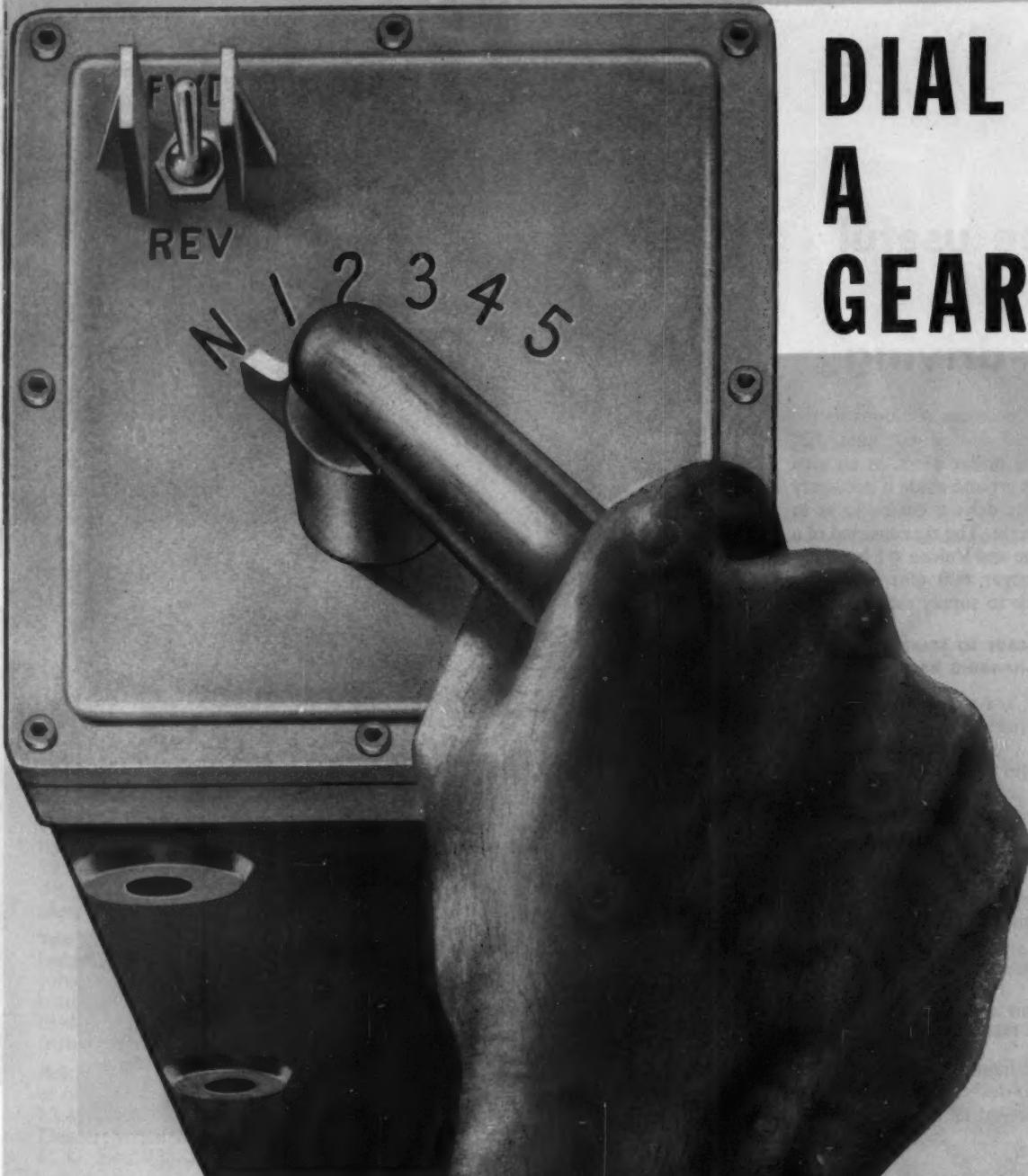
On the above job, piles were driven to point where 35 blows were needed to drive 1". Depths varied from 35' to 105'. A Jaeger "600" rotary compressor was used because it maintains steady air pressure under the

widely fluctuating demands of pile driving, and produces each 500 cu. ft. of that air with less than 1 lb. of fuel. Full load speed is only 1700 rpm compared with 1800 rpm in all other rotaries which use the same

GM 6-71 diesel engine.

Ask your Jaeger distributor about these efficient rotaries for your work — or send for latest catalog. The Jaeger Machine Company, 800 Dublin Avenue, Columbus 16, Ohio.

DIAL
A
GEAR





pays off again

FOR TOUCH AND GO SHIFTING WITH SYNCHROTOUCH TRANSMISSION CONTROL

Now Caterpillar research gives you an advanced new way to shift gears. Operator simply dials desired gear.
Split-second shifting. Available for DW20 and DW21

From Caterpillar's No. 1 Project* comes one of the most important earthmoving developments of recent years—*SynchroTouch Transmission Control*. This remarkable advance combines economical direct drive transmission with the easiest, fastest shifting imaginable.

SynchroTouch Transmission Control is an optional arrangement for Cat DW20 and DW21 Tractors that permits effortless shifting of transmission gears by means of a gear selector conveniently placed near the operator's right hand.

To shift up or down, the operator simply moves a selector switch to the desired gear. In less than a second it is engaged. The standard foot clutch is retained, but it is used only when starting from a standstill.

Fully job tested in the field, SynchroTouch Transmission Control is ready now to give you these important benefits:

1. Faster shifting—for faster cycles, more payloads per hour.
2. A significant reduction in operator fatigue—for more daily production.

3. Economical direct drive transmission—uses standard DW20 and DW21 transmission and clutch components.
4. No special maintenance required.

Add SynchroTouch Transmission Control to either the new DW20 or DW21 (Series G), and you have the last word in modern, high-speed, efficient earthmoving equipment. Both of these outstanding Caterpillar wheel-type Tractors are delivering more horsepower (345 HP), rim-pull and capacity than ever before. Now, see them in action with the SynchroTouch Transmission Control!

Call your Caterpillar Dealer and ask to see a new DW20 or DW21 with SynchroTouch Transmission Control as soon as possible.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH
PROVED IN THE FIELD

HOW IT WORKS

SynchroTouch Transmission Control uses hydraulics as a source of power and is activated and controlled electrically. When the desired gear is dialed on an upshift, the following sequence occurs in a split second:

1. Control Unit signals master clutch to disengage.
2. Control Unit signals hydraulic system to shift transmission to neutral. Shifting collar is disengaged from present gear.
3. Generators notify Control Unit when transmission is synchronized for shift (shifting collar and desired gear at same RPM).
4. Control Unit signals hydraulic unit to shift to desired gear. Shifting collar engages new gear.
5. Control Unit signals master clutch to re-engage. SHIFT COMPLETE.

* Caterpillar's multimillion-dollar research and development program—to meet the challenge of the greatest construction era in history with the highest production earthmoving machines ever developed.





Walter Ware, president and general manager, Tru-Mix Concrete, Inc., Portland, Oregon

FLEET OWNER REPORTS...

"NEW UNION 7600 GASOLINE IS MAKING MONEY FOR US"

"Our records prove New Union 7600 Gasoline is making money for us—

"Better performance is the unanimous opinion of our drivers. New 7600 Gasoline is giving better-than-ever performance throughout our fleet of Internationals and Diamond Ts. Greater power in every gear, fewer downshifts, mean more trips per unit per day.

"Increased mileage was noted immediately after we switched to New 7600. Fuel consumption dropped significantly when engine ignition was advanced to take advantage of its higher octane rating.

"Reduced maintenance costs are immediately apparent, too. Our shop superintendent reports New 7600 is cleaner-

burning. Carbon deposits in the combustion chamber, and replacements of fouled plugs are the lowest in our 12-year operational records."

As Walter Ware and other Western truck fleet operators have discovered — Union's New 7600 Gasoline is *powered like a premium but priced like a regular.*

New 7600 has the highest octane rating of any regular in the West... high enough to give knock-free performance to 4 out of 5 vehicles on the road.

And more: New 7600 contains Union's exclusive additive NR76 to keep carburetors cleaner, free from gum.

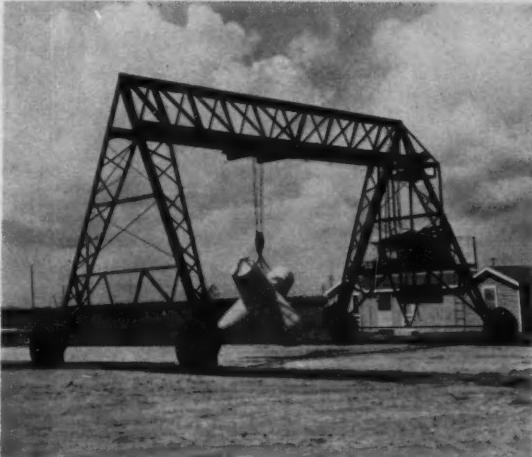
New 7600 is now available generally in the West. Contact your Union Oil representative for immediate delivery.

UNION OIL COMPANY OF CALIFORNIA

UNION OIL CENTER, LOS ANGELES 17, CALIFORNIA, U.S.A.

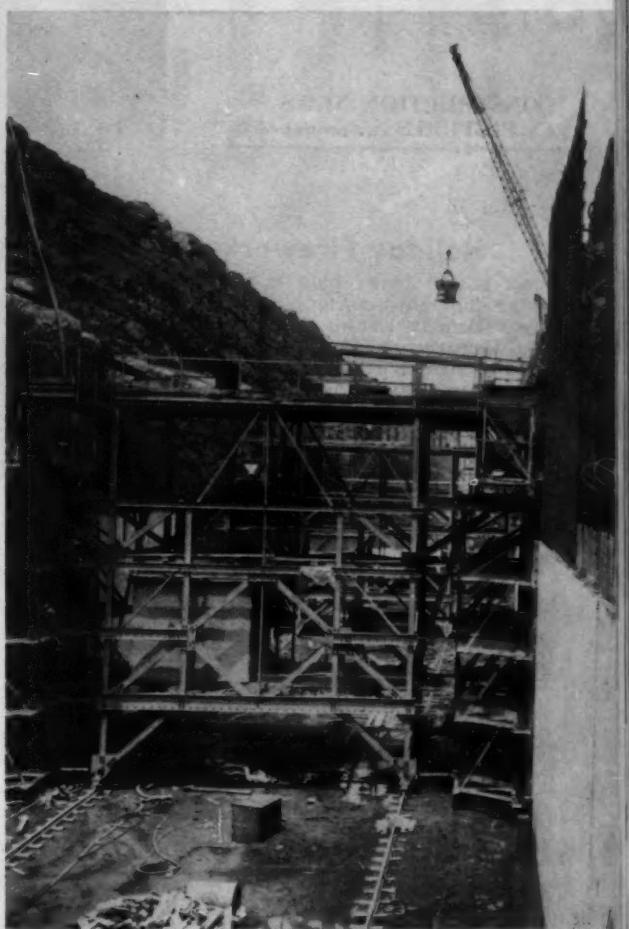
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Construction News in Pictures . . .



Jetty Builder

This hydraulic-powered gantry crane runs on land over a timber track and out into the Gulf of Mexico on a pair of timber trestles to place tetrapods for a jetty. Demison Engineering Division of American Brake Shoe Co. and Elmer C. Gardner Construction Co. built the rig for a harbor improvement proj-



Husky Form Handler

Special Blaw-Knox form travelers move along 100-ft-deep trench of water conduit at Niagara Falls Power Project. The heavily reinforced conduit walls will require a total of 60,000 tons of bars, supplied by Bethlehem Steel. Joint venture of Edward Balf Co., Savin Brothers, Inc., and D. W. Winkelman Co. is the contractor on this section.



Concreting Ring Girder

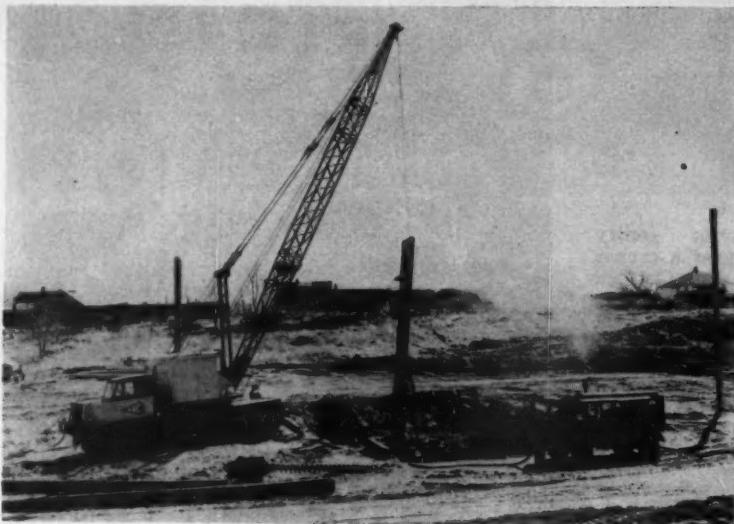
Workmen prepare to pour concrete for a 100-ft section of the ring girder that will encircle the Pittsburgh Municipal Auditorium. Templet on top of the forms positions anchor bolts to hold rails on which sections of the retractable dome will ride. Dick Construction Co. pours one section of the 20x4½-ft ring girder in half a working day.

continued on next page

**CONSTRUCTION NEWS
IN PICTURES . . . *continued***

Holiday Fireworks

Blast at left blows plug to send water through tunnels of Tuttle Creek Dam in Kansas; Martin K. Eby Construction Co. set it off. Blast at right is strictly Fourth of July fireworks; Army Engineers contrived a simulated atomic mushroom to bedazzle spectators on hand for the start of the closure operation on Independence Day.



Bridge Pier Footings

A 35-ton Lorain Moto-Crane drives wood piles 16 ft long and 14 in. in dia for a bridge that will be part of the Minnesota Freeway. The crane is the first to be equipped with double-acting, hydraulic outriggers. Arrowhead Engineers & Constructors, Inc., of Duluth will drive 50,000 ft of piling for this bridge near Little Canada, Minn.

Good Day's Work

In an average 10-hr shift, Green Construction Co of Spartanburg, S. C., moves 10,000 cu yd of fill with a fleet of eight LeTourneau-Westinghouse C Tournapulls scrapers powered by GM6-71 diesels. The job is an approach to an elevated highway bridge 1,400 ft long that will span the reservoir of a dam under construction nearby.



YARDS AHEAD



CURTISS-WRIGHT MODEL

226

CW-226 SELF-PROPELLED SCRAPER

Capacities: 26 cu. yds. struck, 36 cu.
yds. heaped, 78,000 pound rated load

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Throughout the cycle — from the easy loading, through the high speed travel, to the fast dump, you're YARDS AHEAD with Curtiss-Wright scrapers. Designed and built to meet the skyrocketing production demands of today's construction industry, the CW-226 gives users a daily output unmatched by any competitive machine. See how the CW-226 can give your job a production boost — Let your C-W distributor give you complete details on the "Yards Ahead" features of the Curtiss-Wright line.

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SOUTH BEND DIVISION

CURTISS-WRIGHT®
CORPORATION
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How Standard Oil Provides Support For A Bridge Builder

*Dravo Corporation builds
Mississippi River span at
Bettendorf, Iowa,
gets lubricants, fuels and
technical service from
Standard Oil*

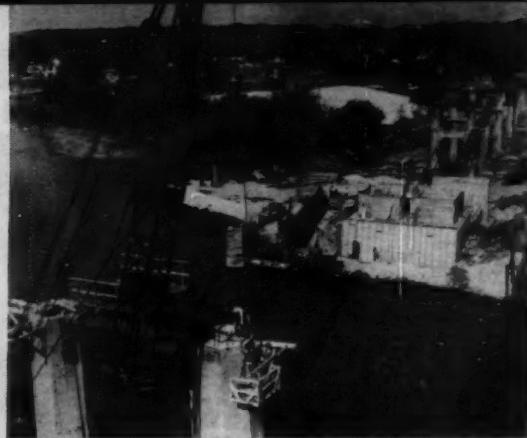


The new, two lane span Dravo is building is an addition to the two lane bridge 72 feet upstream which, until now, has carried all of the U.S. Highway 6 traffic across the Mississippi. Right there to lend support to Dravo is Standard Oil.

Standard Oil storage facilities for the fuels and lubricants are located at Davenport, less than ten miles from the construction site. Standard's Harold Jansen lives in Davenport. He's nearby at all times to render lubrication technical service.

Here's what this means to the contractor: Inventories of lubricants and fuels at the job can be kept to a minimum, yet there is never any waiting for supplies of these products. A trained engineer with ten years' experience in such work is on hand to help maintenance men get the best possible service from equipment. The men who are operating equipment on the job can depend upon the lubricants, greases and fuels being the very top in quality.

Is this the sort of service you want from a supplier? Get it by calling the Standard Oil lubrication specialist near you. There are 48 Standard Oil district offices and nearly 3,600 storage and warehouse points in the 15 Midwest and Rocky Mountain states served by Standard. One of them is near your job wherever you are. **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**



End of a bottleneck. New 5,504 ft. bridge will be supported by 35 concrete piers, 11 in water and 24 smaller ones on land plus abutments and two anchorage piers.



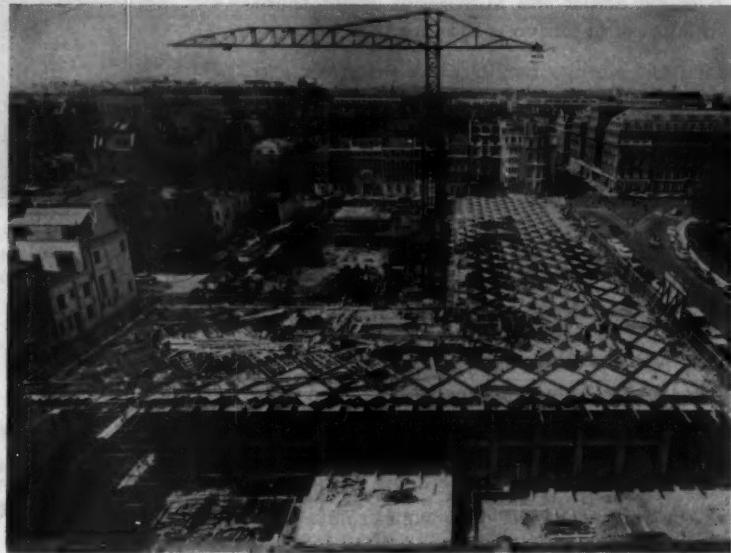
*You expect more from Standard
and you get it!*

Harry Kraus, Dravo superintendent, and Standard's Harold Jansen have a look at the lubrication literature. Harold Jansen knows his way around a construction site. He's been doing work of this kind for ten of the thirteen years he's been with Standard. Harold has special diesel training and has completed Standard's Sales Engineering School.

Construction 'Round the World ...

In England

One of two Jules Weitz tower cranes handle forms, reinforcing, and concrete going into a floor of unusual design in the new United States Embassy Building at Grosvenor Square, London. Wates, Ltd., contractor, builds the second floor in the form of a grid. It will contain 200 tons of steel and \$16,800 in forming and form supports.



In Cuba

Workmen on timber trestle assemble sections of 24-in. Cen-Vi-Ro concrete pipe to form a 2½-mi-long pipeline in Oriente Province. The pipeline will carry ore slurry from a mountain-top mining site to Freeport Nickel Company's processing plant. The pipeline is part of a \$119-million nickel-cobalt mining and refining project.



In Sweden

Thirteen automatic, unmanned Atlas Copco drills fitted to a jumbo send down blast holes during three-stage benching out of rock in the underground Stornorrhors power station being mined alongside the Ume River. Technique is used for first few feet of drilling to prevent injuries to workmen should steels set off an unexploded charge.



DON'T BE AFRAID
TO BID A
WET
JOB

Contractors on three sections: Columbia Construction Co., Thompson Construction Co.,
Tousley Construction Co., Inc. — all Indianapolis

Photo shows one of the three sections of Lick Creek Sewer in Indianapolis, Indiana, where Moretrench Wellpoint equipment enabled the contractors to overcome threatening water levels and to place 50,000' of pipe in a bone dry trench.

Water levels on the entire project varied from 15' to 22' in constantly changing

soil ranging from all sand and gravel to stratified clay and gravel in a hard clay bottom.

Careful installation and expert supervision on this work guaranteed results — gave each contractor freedom to excavate as he saw fit and to progress as rapidly as possible with economy and safety.

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B.F.Goodrich

All B.F. Goodrich Grommet V belts are double-matched at no extra cost

B.F. Goodrich V belts now have 40% greater horsepower rating

ALL B.F. Goodrich V belts now have a 40% greater horsepower rating. This higher capacity rating was formerly found only in high capacity belts, but now costs *no more than former standard belts*. This means that lighter, more compact, and lower cost drives can now be used, because these B.F. Goodrich belts carry the horsepower needed for efficient drives using fewer belts at standard belt prices. And all B.F. Goodrich Grommet belts are double-matched.

Double matching assures you that

a set of B.F. Goodrich V belts are of equal length when installed and will stay uniform in length for the life of the belts. When V belts of different lengths are put on the same drive, longer belts loaf, while shorter ones carry all the load and fail quickly. B.F. Goodrich double-matched belts are measured twice for uniform length, once when manufactured and again after storage. Only belts that are of equal length when manufactured and after storage are grouped into sets.

Grommet construction is exclusive

in B.F. Goodrich V belts. Grommets are two extra strong cord loops, inside the belts, like twisted cables, except they are endless. Unlike ordinary belts, there are no center cords in the Grommet belt, so it is more flexible, can "give" temporarily and absorb shock loads.

Let your B.F. Goodrich distributor show you how this higher capacity, longer belt life, ability to stand hard use, can reduce your V belt costs per year and make other savings in operating and maintenance costs. *B.F. Goodrich Industrial Products Co., Dept. M-666, Akron 18, Ohio.*

B.F.Goodrich v belts

Construction Methods

AND
EQUIPMENT

AUGUST, 1959

VOLUME 41 • NUMBER 8

HENRY T. PEREZ, Editor

Still In Trouble

THE FEDERAL HIGHWAY PROGRAM still remains in serious trouble—Congress has not yet passed a financing bill that will enable roadbuilding to proceed on schedule. Indeed, unless the legislators face up to their responsibilities without delay, The Bureau of Public Roads will be unable to reimburse the states for all work already awarded to contractors.

In addition, unless a suitable bill is passed, right-of-way acquisition and letting of construction contracts probably would have to be suspended for nine months. And apportionment of monies from the Highway Trust Fund for the next two fiscal years would be cut drastically.

The inability of Congress to pass a highway financing bill has already caused serious disruption to the orderly progress of roadbuilding. Because of uncertainty over the availability of future funds, several states have postponed or cancelled lettings of important portions of the Federal-Aid system. More and more highway departments will be forced to do so as long as indecision in Washington continues.

Latest action in the Capital was taken by the House Ways and Means Committee. It recommends a financing plan calling for a \$1-billion bond issue to be paid off within five years from the Trust Fund. The plan also calls for transfer to the Trust Fund of one-fifth of the excise tax on new automobiles. All of this tax now goes into general funds.

While this scheme would provide some money almost immediately, it actually would hurt roadbuilding in the long run. That's because completion of the Interstate System would be set back from 1969 to 1975. And allocations for fiscal 1961 alone would be cut from \$2.5 billion to about \$600 million.

Furthermore, such a financing plan faces serious threat of a presidential veto because of the bond and tax-transfer provision. Loss of revenue to the gen-

eral fund by the latter would probably require another bond financing program. Debt service on these bonds would increase the government deficit, and debt service on the highway bonds would reduce the funds available for roadbuilding.

Bond financing and stretch-out of the Interstate Highway program are bound to make highways cost more. Yet this fact is overlooked or ignored by those lobbyists and congressmen who attack the Administration's suggested solution to highway financing—a 1½-cent increase in the federal gasoline tax.

Those persons take the attitude that the highway user is already paying enough taxes. Well, perhaps he is. But in the majority of instances, the highway user is paid for his services. And the gasoline tax he pays is passed on and ultimately is paid by those he serves. In the case of the highway user, this becomes just about everybody.

So, in the final analysis, the general taxpayer pays for our roads. It would seem only logical, then, to keep the cost of roadbuilding as low as possible. This requires an orderly continuation of the originally planned highway construction program, with no delays and no stretch-outs.

Lowest-cost roadbuilding also requires lowest-cost financing. And this calls for an increased gasoline tax rather than bond financing, especially at today's high interest rates.

Actually, the public probably is prepared to pay a higher gasoline tax for the privilege of driving on faster, safer modern highways. It already is paying a premium for doing so on toll roads. So it is time—past time, actually—for Congress to face up to its responsibilities. It should enact the gasoline-tax financing plans of the Administration. Such a plan would quickly be signed into law so that the construction industry could get on with the building of the highways the country needs.

*An equipment spread that includes a 17-*yd* dragline, an elevating loader, and large scrapers has put the contractors ahead of schedule at Navajo Dam.*

A FLEET of husky earthmoving machines—and three joint venture contractors who are old pros in the dambuilding business—have put construction work away ahead of schedule on the Navajo Dam Project in northwestern New Mexico.

Morrison-Knudsen Co., Inc., is sponsoring the joint venture. Other members of the group are Henry J. Kaiser Co. and F. & S. Contracting Co. The joint venture has a \$22.8-million contract with the U. S. Bureau of Reclamation to build Navajo Dam, the second largest earthfill dam project the Bureau has ever undertaken.

Included in the impressive list of heavy equipment are a 17-*yd* dragline and 36 hauling units of 27 and 30-*yd* capacity. But big equipment isn't the whole story. There are several other reasons for the fast pace:

- The contractors took full advantage of the borrow area layout to start full scale earth moving right from the beginning of the job. They won't need to divert the river until later this month.

- An unusually mild winter last year was a big break. The contractors hope to duplicate the winter operation again this year, regardless of the weather, by smart winter planning.

- To handle the vital job of compaction, the contractors developed a unique, self-propelled, sheepfoot roller that cuts in half the expected number of passes required over the lifts of fill.

Navajo Dam is a major unit in the Colorado River Storage Project. Other major dams in the system currently under construction are the Flaming Gorge Dam in Utah and Glen Canyon Dam in Arizona. Both the latter dams are concrete arch types and involve hydroelectric facilities. Navajo is an earthfill structure, designed mainly for irrigation purposes. It will have no power facilities, but the outlet works were designed so a power installation can be added later.

Navajo Dam will be 388 ft high, 3,800 ft long at the crest, and about $\frac{1}{2}$ mi thick at the base. It will require 26,000,000 cu *yd* of fill.

Contract was awarded to the joint venture in June, 1958. Specified completion date is June, 1962.

Fast Start

By moving the river into an artificial channel close to one bank, the contractors exposed over half the river bed. This enabled them to start immediately on the excavation and grouting in this area. They will be able to place 6,000,000 cu *yd* of fill on this half of the dam before they have to divert the river. By that time, diversion tunnels, now under construction, will be ready.

The borrow areas and job layout were carefully planned in advance. Most of the fill comes from the river bed within a 2-mi haul below or above the dam. In addition, almost all of the foundation and structural excavation is suitable for fill material.

The contractors started on the upstream borrow areas first because these sites may be flooded after the river diversion. Next, they will work the downstream sites in the river bed. The river

Big Earthmovers Set Fast Pace



SCRAPER

A total of 1,465 hp is applied to the job of loading a scraper in the borrow area as two Euclid twin-engine TC-12 dozers push-load a twin-engine Euclid 27-cu-*yd* scraper.

LOADER

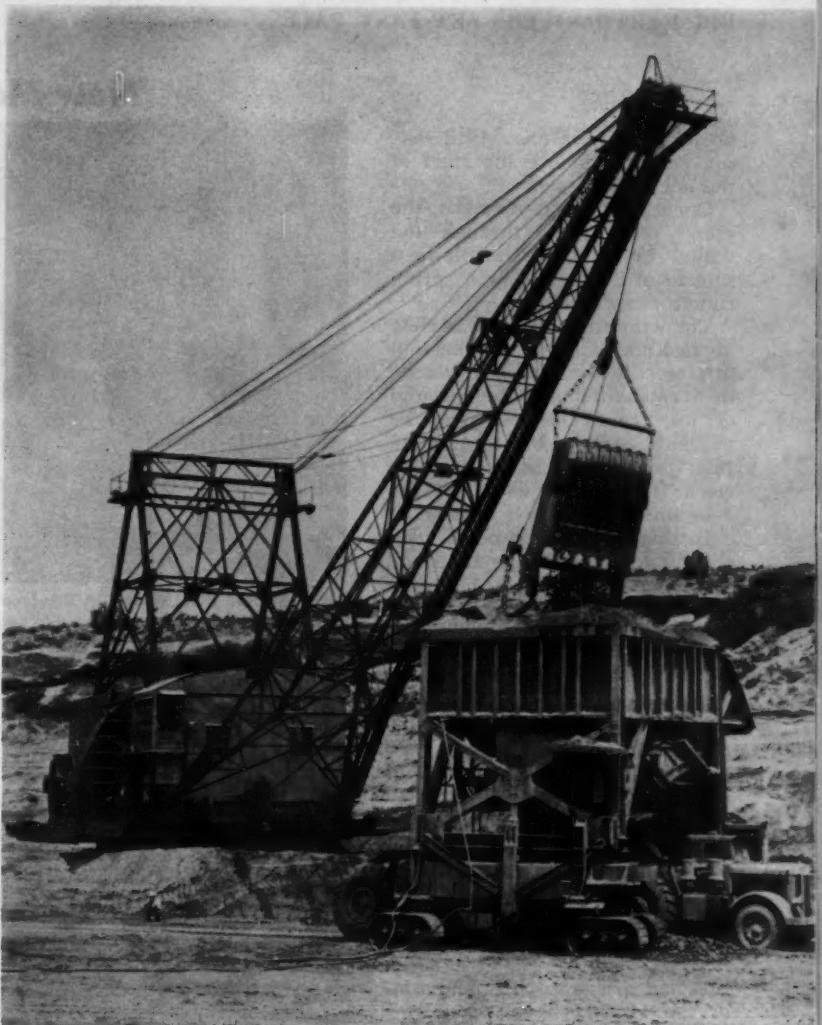
Two Allis-Chalmers HD-21 tractors tow a Euclid elevating loader as it fills up a Euclid 27-*yd* scraper with earth for the dam. Loader handles marginal fill.

bed sites are the most logical sources while the dam is still low. When the fill gets higher, the contractors will start hauling fill from sites on top of the banks.

Almost all the fill material is available right at the site. The only item lacking is riprap. About 150,000 cu yd is needed; the contractors will have to haul it 50 mi to the site.

Most of the borrow areas are covered with about 10 ft of fine-grained silt and soil that is ideal for impervious core material. Beneath this is a thicker layer of well-graded sand, gravel, and cobbles that is good material for the pervious sections of the shell surrounding the core.

The main problem with the fill is that it is too dry. For proper placing, the core material has to be wetter than it is in its natural state. To increase the moisture content, the contractors run water over a fill area by a sprinkler irrigation system before they remove the material. The sprinklers take about 30 days to do the job. Sprinkling can be done as much as 6 months in advance.



e on Dam Job



DRAGLINE

Bucyrus-Erie 17-yd Monighan 450W walking dragline loads 65-yd hopper rather than loading trucks directly. This allows dragline to operate without loading delays.

Winter Work

Taking advantage of last winter's unusually mild weather, the contractors worked steadily through the first year to place 5,400,000 cu yd of earth. They hit a maximum rate of 600,000 cu yd per month. Next year, as the haul distances become shorter, they hope to hit 1,000,000 cu yd per month.

Next winter will be critical. The plan is to divert the river in October or November. This will

BIG EARTHOVERS SET FAST PACE... continued

be just after the flash flood season and just before the start of the low-flow season.

Once the river is diverted, the crews must work through the winter to build up the fill to a safe level before the high spring runoff starts in May.

The winters in this part of New Mexico normally are cold enough to freeze the ground. Of course, in an earth fill dam, frozen ground or ice cannot be tolerated. To prevent freezing, the contractors plan to work right around the clock during the winter, three 8-hr shifts, seven days a week.

In this way they hope to keep the fill moving all the time and prevent it from freezing. At present the crews work only two 9-hr shifts, five days a week.

Earthmoving

The contract price for excavation and transporting the fill (but not including placing and compacting) is 36¢ per cu yd. To keep the unit price this low, the contractors brought in some large machines to move the earth.

The most conspicuous rig is a 17-*yd* Bucyrus-Erie Monighan 450W walking dragline that can handle 8,000 cu yd per 9-hr shift. It works on the gravel excavation and probably will handle all of the 11,250,000 cu yd of this material required for the previous fill.

It's important to keep a rig of this size working continuously; even the delays involved in loading bottom-dumps can reduce its efficiency. The contractors have eliminated loading delays by having the dragline deposit fill into a 65-*yd* movable hopper. The hopper in turn loads 30-*yd* Euclid bottom dumps that haul the fill to the dam.

The hopper is mounted on Athey crawler tracks. It is not self-propelled, but a service tractor moves it around as required. Hydraulic pump motors, powered by a 75-kw generator, operate the gates of the hopper. Air jets, supplied by a 900-cfm compressor, keep the material loose in the hopper.

A fleet of 11 twin-engine Euclid 27-*yd* scrapers work out of other borrow pits. Some of the scrapers are loaded by cranes;

New Machine, Old Methods



SHEEPSFOOT ROLLER—Newly developed Ferguson rig features two pairs of sheepfoot rollers mounted in tandem. Rig does tamping in six passes instead of usual twelve.



WATERING—Irrigation sprinkler system waters fill before it is removed from borrow area. Most of the fill is so dry that it must be sprinkled for 30 days before it is used.

others are pushloaded by pairs of Euclid TC-12 dozers. In the latter case, with two twin-engine dozers pushing a twin-engine scraper, a total of 1,465 hp is applied to the job of loading the scraper.

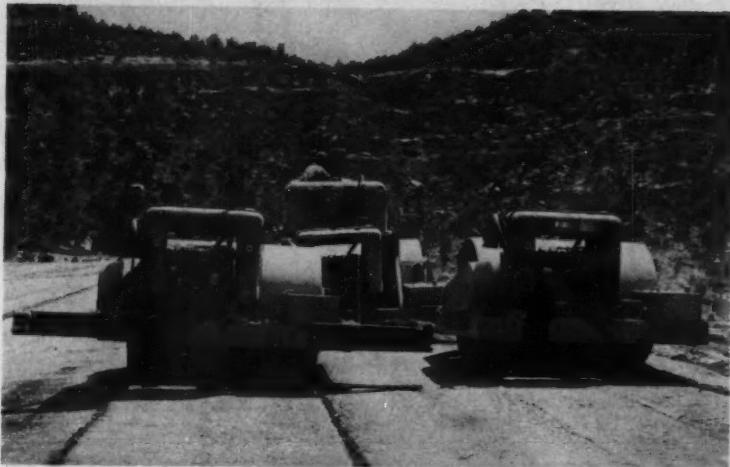
A small amount of marginal material is excavated by a Euclid elevating loader. Two Allis-Chalmers HD-21 tractors haul the loader around. It loads bottom dumps, scrapers, or utility end dumps, depending on the situation.

Placing and Compacting

The most unusual rig on the job is a Ferguson self-propelled tamping roller developed by Shovel Supply Co. of Dallas. The unit reportedly can do as much compaction as three tractors and three conventional rollers.

It consists of an assembly of four sheepfoot rollers, each 5 ft in dia and 6 ft long. Each roller is individually driven by a 100-hp General Motors diesel engine, Allison torque converter, and

Process Fill Material



VIBRATORY ROLLERS—An Allis-Chalmers HD-21 tractor pulls three Essick steel vibratory rollers over pervious fill. This fill is placed in the shell of the dam in 18-in. lifts.



EXCAVATION—Crews carve spillway out of sandstone ridge. Most of the material that comes out of the various excavations on the project is suitable for fill in the dam itself.

three-speed power shift transmission. One operator in a central cab controls the four rollers with a common throttle.

Each roller can oscillate in every direction so the unit can follow the undulations of the fill. The rollers operate in either direction so the rig never has to turn around. This saves more than 10% in operating costs.

Shifting gears on all rollers is simultaneous and practically automatic. Average operating speed is 4 mph. Steering is handled by two large double-acting hydraulic cylinders between the front and rear rollers.

The tamping roller weighs 96,000 lb empty and 120,000 lb when ballasted with water. This represents 5,000 lb per ft of drum length. The unit was built to meet requirements of the Bureau of Reclamation.

The Ferguson rig handles the impervious material. Bureau specifications require 12 passes of a sheepfoot roller. By mounting the rollers in tandem, the new rig can satisfy the specifications with 6 passes.

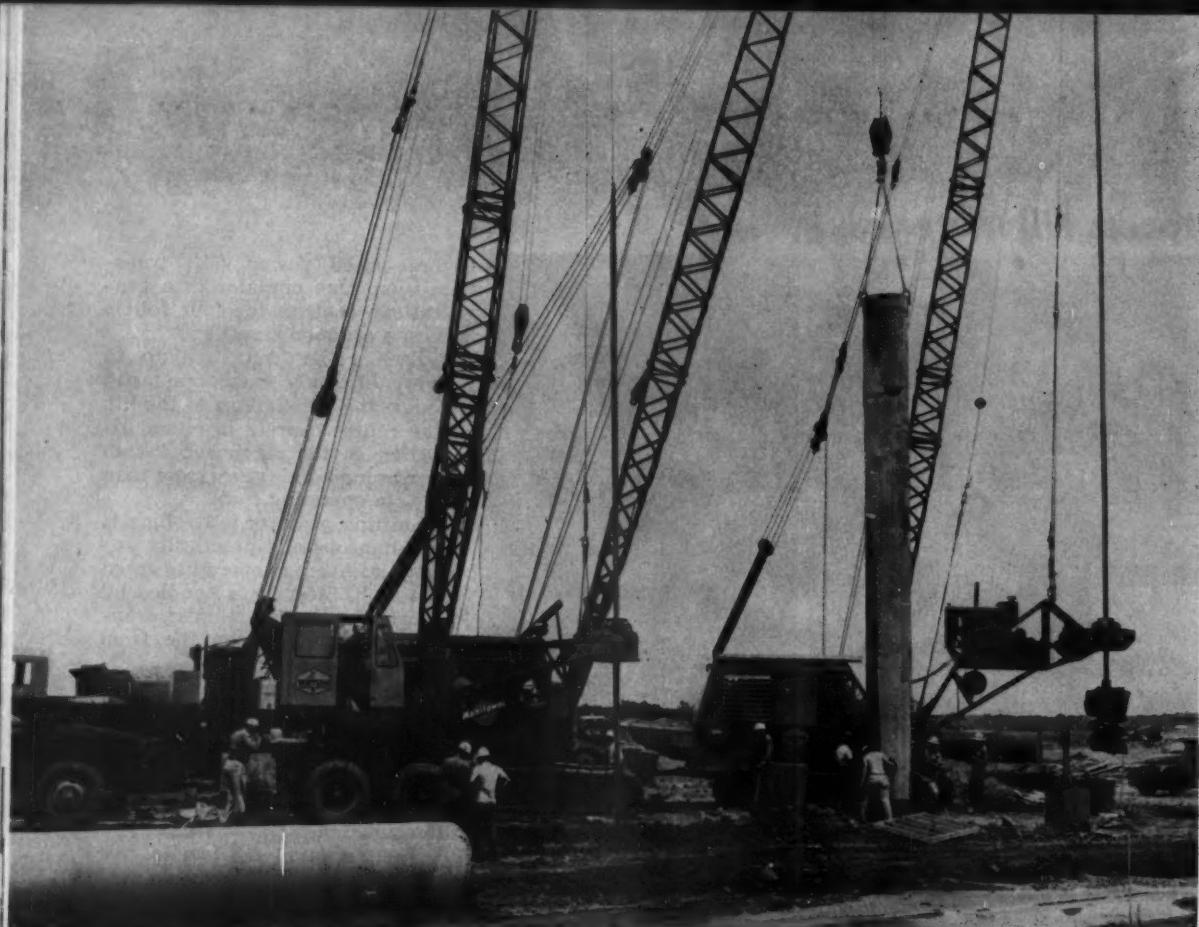
After the material is spread by the scrapers, and before the Ferguson rig passes over it, a tractor-drawn disc harrow and land plane run over the fill to insure complete processing and levelling.

On the pervious fill, three Essick steel vibratory rollers drawn by an Allis-Chalmers HD-21 tractor handle the compaction. Pervious fill is placed in 18-in. lifts.

Two diversion tunnels will form part of the permanent works as well as diverting the river during construction. The larger tunnel is at river level and will be concrete lined to 18-ft 9-in. dia. The contractors have completed the excavation and are just starting to concrete.

For the contractor, the job is under the overall supervision of B. L. Perkins, who is district general superintendent for Morrison-Knudsen. H. D. Gard is project manager, and Max Daley is project engineer.

W. W. Brenner is project construction engineer for the Bureau of Reclamation. E. D. Henry is field engineer, and J. D. Seery is office engineer.



CROWD OF CRANES—With a different crane specially fitted for every task, contractor places 1,200 piles in a hurry. Left crane

augers through top 60 ft of sand. Center crane lowers casing into augered hole. Right crane extends hole into bearing stratum.

Drilling 1,200 Piles in 90 Days



STARTING THE AUGER—Drill rig lifts auger after first few feet of drilling. Metal ring on ground guides bit at this stage.

A PRODUCTION LINE arrangement of drill rigs, in which each of eight machines was able to concentrate on a specialized job, allowed Watson Foundation Co., Inc., of Fort Worth, Tex., to drill and pour 1,200 concrete foundation piles in three months.

The piles varied in diameter from 24 to 48 in. Average depth was 65 ft. Total concrete required for the foundation piles was more than 13,000 cu yd.

Watson's production line completed a hole every 35-60 min. This added up to about 22 holes drilled per day. The lineup of machinery included five drill rigs plus three service rigs that handled casings, concrete pouring, and other tasks.

The foundations are for the new Oklahoma City plant of the Western Electric Co. The project includes a three-story office and one-story plant for making dial

central office equipment for the Bell Telephone System.

Soil conditions were a big problem. To reach a solid bearing stratum, the foundation piles had to pass through 60 ft of water-bearing fine sand.

Watson managed to come up with the right combination of equipment and the right mixture of drilling mud to shore the sides of the drilled holes in this tricky sand. Once they had these answers the job went fast.

The first specialized machine in the sequence was the drill rig. This was a truck crane that Watson adapted to carry a drill, along with a motor to power it.

First step in the drilling operation was to place a circular metal guide, or collar, at the spot to be drilled. The drill crew started the drill through the metal guide. After a few feet of drilling, they removed the guide.

The drill then passed through 8 to 12 ft of topsoil before it reached the sand. The ground water table roughly coincided with the top of the sand, so the topsoil layer was relatively dry. Watson drilled the topsoil in the dry. When they reached the sand, they started the mudding operation.

Drilling Mud

The drilling mud helped lubricate the drill auger during drilling. Even more important, it formed a seal around the hole and prevented cave-ins. The crew poured a dry mixture of mud from sacks into the hole and poured water in on top of it to make it fluid.

Even though the sand was saturated with water, they had to add about 1,500 gallons of water per hole to get the proper consistency in the mud. This was partly because the mud absorbed a tremendous amount of water. Also, once the mud wall in the hole had started to form, it sealed off the hole and prevented the ground water from reaching later additions of dry mud.

As soon as the drill reached the firm bearing stratum, it was withdrawn and the rig moved on to the next location. A Manitowoc 3000B service rig moved in and lowered a steel casing into the hole. The casing slid easily through the semi-fluid slush to the bottom of the hole.

Watson fabricated the casing. It consisted of 5/16-in. steel plate for most of its length. The top 12 in. was built up with a collar 1 in. thick.

After the service rig placed the casing in the hole, it moved on and a third specialized machine took over. This was a specially rigged Manitowoc 2000B crane with attached drill and separate engine for the drill.

This rig screwed the casing about 18 in. into the bearing stratum to seal off the hole from the sand strata and make the hole watertight. Then the rig bailed out the slush from the casing with a 75-gal bailing bucket.

When the hole was dry, an auger bit was placed on the drill's kelly, and the rig drilled into the bearing stratum. It went in from 9 to 25 ft—as far as the inspector considered necessary to reach a solid bearing level. Samples of the soil taken at various stages of penetration helped him make the decision.

Concreting

Then the drill crew moved on and the concrete specialists took over. They poured concrete directly into the casing from a ready-mix truck. It took about 10 cu yd of concrete for the 24-in. holes.

The concrete was designed for 3,000 psi. To get maximum fluidity without increasing the water

content, Watson used six sacks of cement per cu yd and 3 to 5% air entrainment.

The open area around the top of the hole between the wall of the hole and the casing was back-filled with gravel to absorb mud displaced by the concrete during the raising of the casing.

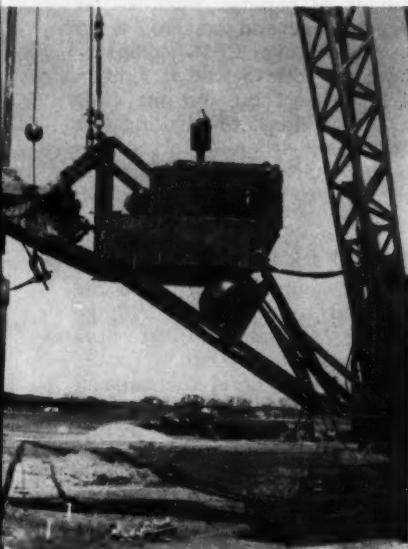
During the pulling operation, the concrete moved outward and up the outside of the casing, filling the space outside the casing. When the casing was nearly up, the crew checked the concrete level inside it. If extra concrete was needed, it was poured in before the casing was completely removed.

After the casing was finally removed, a finishing crew smoothed off the top of the pier to the proper elevation and inserted anchor bolts or reinforcing dowels as required.

Modified Machinery

Watson modified the drill rigs to their own requirements. The Manitowoc 2000B was adapted by the manufacturer to develop an unusually high single line pull.

The attached drilling unit was designed by Watson. It was capable of driving the auger bit at high speed through the sand. At the same time, its transmission and control system allowed for a wide range of speeds and torque so that it was adaptable to various soil conditions.



DRIVING CASING—Drill rig lowers casing several feet into lower bearing stratum.



CONCRETING—Ready-mix truck pours concrete directly into casing. Crane will pull casing after concreting. Tractor shovel fills space around top of casing with gravel.

Fourteen blast holes, drilled up to 96 ft deep and at an angle of 32 deg, enable a blasting contractor to slice off the face of a cliff in one shot.



DRILLING—Gardner-Denver Air Trac with boom set at 32-deg angle drills 2½-in.-dia holes as much as 96 ft deep along top of cliff to prepare for the one-shot blast.

Here's a New Slant to Drilling

ONE BIG SHOT!

That seemed the most economical way—at least to the blasting subcontractor—to grade a steep rock cliff to a 1½-on-1 slope for the new Potomac River Water Treatment Plant near Washington, D.C.

Drill and explosives experts didn't think the job could be done that way. But Burnbrae, Inc., the blasting firm awarded the job, figured one massive shot would do the job better than a series of time-consuming small firings.

It required drilling bore holes

up to 96 ft deep at a 32-deg angle from the horizontal. If the consistency of the rock strata varied excessively, there was a possibility of the bore holes swinging out of line by several feet. And, even if the holes were drilled successfully, there remained the problem of loading and tamping charges to the required depth on the 1½-on-1 slope.

The cliff face, 16 mi up the Potomac from Washington, is approximately 110 ft high and 75 to 90 ft wide. It faces the Potomac about 600 ft back from the

river's edge. At its foot will be the raw water pumping station; at its summit, the treatment plant proper.

Burnbrae, working closely with DuPont's technical specialist at the job site, planned the drilling and loading in two sections. A projection on the western side of the face had to be cut off. Here a varied pattern of 48 vertical 2¾-in. holes, on a 24 x 4-ft grid pattern 5 to 10 ft deep, was drilled without difficulty.

For the more important main face, 14 holes from 35 to 96 ft deep were drilled on 4-ft centers at the difficult 1½-on-1 slant. All drilling was done with a Gardner-Denver 99 hammer mounted on an Air Trac and powered by a Gardner-Denver RP365 compressor. Even with the use of Timken carbide-insert bits on the G-D carborized steels the drilling was slow going—about 2 ft per hr—in the quartz-streaked rock. In the other rock the rate was 25 ft per hr.

Drills Work Deep

At the outset, the rig was not expected by the local drilling-equipment representative to produce more than 60 ft of usable 2¾-in. bore hole at the unusual slant, but as the work progressed depths were pushed to 80 ft and finally to a maximum of 96 ft.

Burnbrae had hoped to reach 110 ft—the full depth of the sloped face—but extremely hard layers of quartz precluded bore holes of that optimum depth. There was no difficulty in clear-



LOADING—Workmen with flexible polyethylene tamping rod ram charge set deep in one blast hole while second group (left) pours DuPont's Pelletol I about half way up another.

ing the holes—the air velocity of the standard rig handled the job.

The 48 short vertical holes were loaded with standard 1½-in.-dia sticks 8 in. long containing DuPont 40% Special Gelatin. One stick was loaded into holes farthest from the face and seven sticks in the holes along the face. Six of these face holes were deck loaded and primed with instant caps. The remaining 42 holes in the group were primed with one cap each—instant near the face and an MS-25 in each of the 26 holes farther back.

The 14 holes on the 1½-on-1 slope presented a problem—mainly of tamping. What finally filled the bill was 84 ft of 1½-in. ID polyethylene water pipe. Though it was made up of several sections, this highly flexible tamping pole was used throughout the work without uncoupling.

The bottom of each of the 14 slanted holes was primed with a single stick of power containing 40% gelatin. This stick anchored Primacord that extended the full length of the hole. All holes then were filled to half their depth with DuPont Pelletol 1—a granular, free-flowing blasting agent consisting of smooth round pellets about ¼-in. in dia.

The free-running agent was used instead of rigid units because of the possibility that the bore holes were crooked or partially blocked in their lower portions and because of the tamping difficulty.

There was some doubt at the

outset as to whether or not the Pelletol would travel the length of the holes. At first, the hollow tamping rod was inserted and the Pelletol poured through it, but this procedure was slow. When the free-running agent was simply poured into the bore holes, it passed through easily.

At the halfway point in each of the 14 slanted holes, another stick of 40% gelatin was placed, this one primed with an MS delay cap ranging from MS-50 on the west side of the face through MS-75 and MS-100 to MS-125 on the east.

Burnbrae makes extensive use of MS caps in all dynamiting work to control concussion, vibration, and fly.)

The holes then were loaded to within 10 ft of the top with sticks of 40% gelatin. The 8 longest holes of the 14 were primed once more near the top with the appropriate MS cap, then all were tightly stemmed.

For this shot, 500 lb of Pelletol 1 and 700 lb of 40% Special Gelatin were used. Priming consisted of 79 caps and 1,000 ft of Primacord. Pelletol density was 2½ lb for each foot of 2½-in. hole.

Safety Measures

Because the composition of the cover was quite variable and the loading was unusual, all personnel and observers were urged to find adequate protection a good distance from the site. The entire loading, wired in two series, was triggered at 5:45 pm, well after

work on the main contract had closed down for the day.

A rumbling came from within the hillside an instant before the surface erupted. Then the face surged forward with surprisingly little fly of debris for the excellent fragmentation that resulted. Average size of the broken rock was 1½ cu ft.

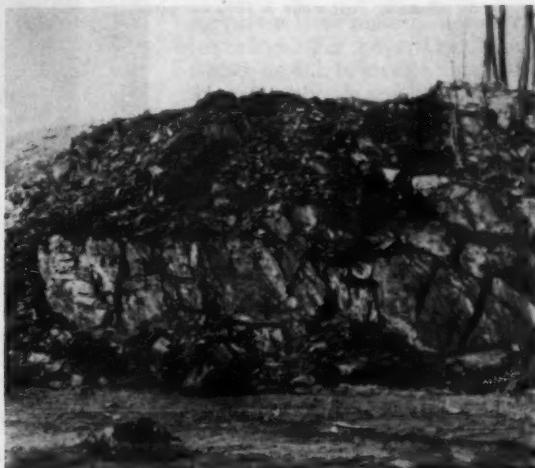
At the foot of the cliff a fairly high face of rock remained unbroken. This, too, would have been shattered in the main blast if Burnbrae had been able to extend the bore holes to the 110-ft depth. As it was, the remaining face was drilled in a separate operation several days later. Twenty-five holes up to 20 ft in depth were drilled upward into the face at a 1½-on-1 slant and were loaded with 40% gelatin in 1½ and 2-in. sticks. The holes were stemmed with sand-filled tamping bags, and the entire remaining face was well fractured in one firing, again primed with MS-delay caps.

Removal of the fractured overburden was begun with a backhoe at the top of the cliff. Subsequent clearing was done with a dozer working across the cliff face in benches.

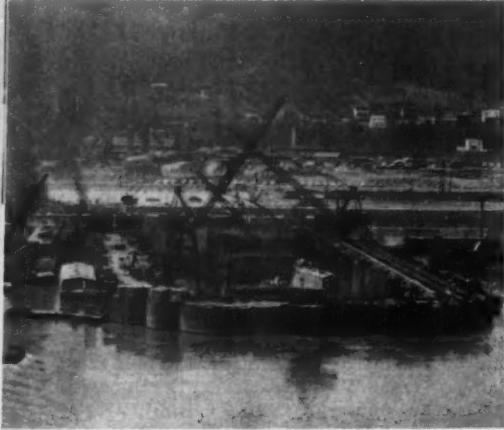
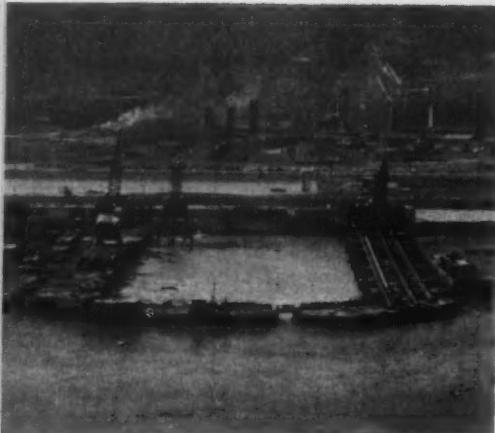
General contractor for the entire project is Malan Construction Co. of New York City. Contractor for excavation is Green & Dyer, Washington, D. C. Burnbrae operates out of Baltimore. The water treatment project is being built for the Washington Suburban Sanitary Commission.



BEFORE THE SHOT—Rock outcrop rises almost 110 ft high to form a cliff 75 to 90 ft wide, 600 ft back from banks of Potomac.



AFTER THE SHOT—Ledge rock is broken into small fragments except at foot of slope where drills could not go full depth.



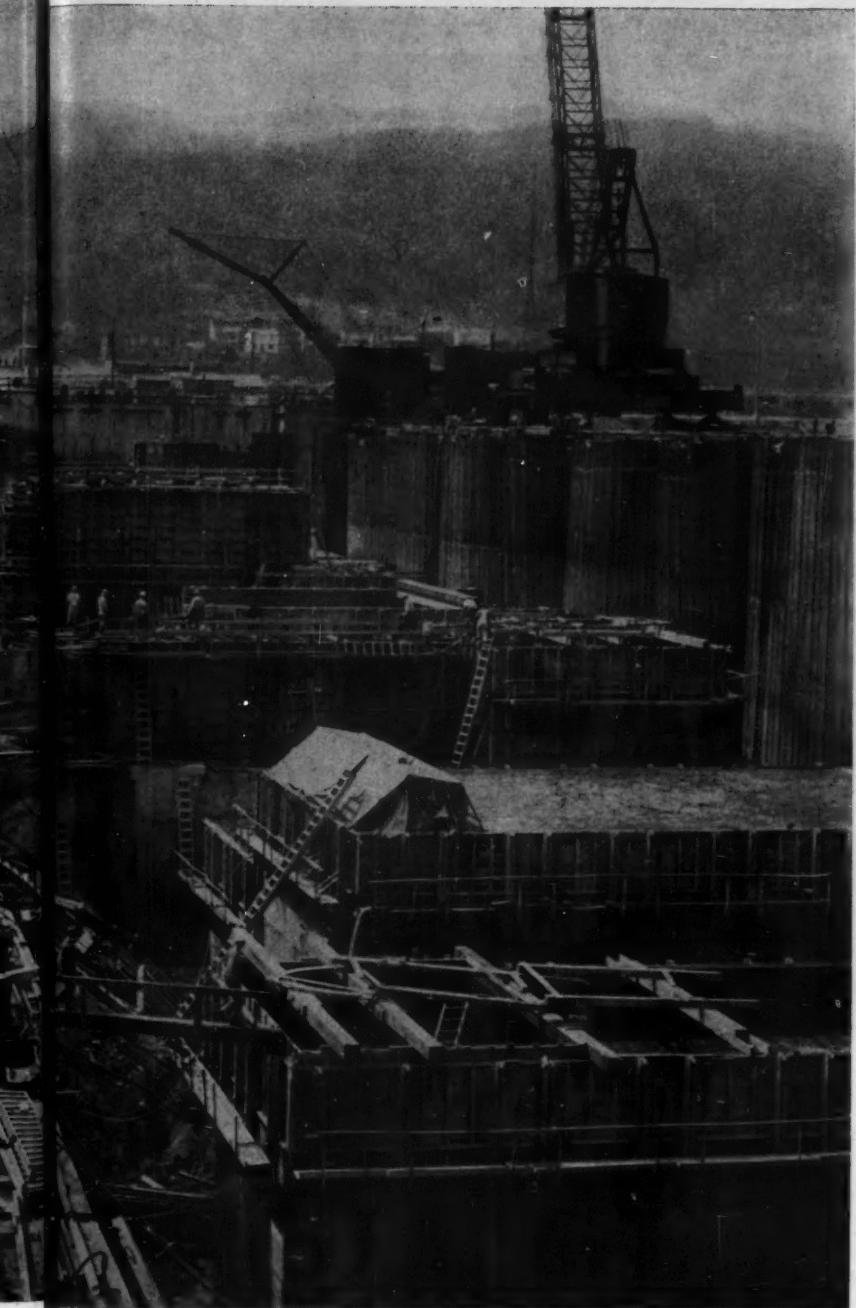
BEFORE AND AFTER—Floods twice this spring filled the first stage cofferdam at New Cumberland Dam, stopping work for a month. In spite of delays, job is now almost on schedule. First stage is 70% complete.



PIERS SEPARATING MASS CONCRETE BASE OF DAM INTO BAYS RISE STEP BY STEP INSIDE

They Made Money on Floods

Using 54-ft-dia cofferdam cells instead of the 70-ft cells originally called for by the Corps of Engineers, Dravo Corp. figured they'd be held up at least once by floods. Even though they got flooded out twice the job is paying off.



EP BY P INSIDE FIRST STAGE COFFERDAM. GANTRY CRANE ALONGSIDE HANDLES CONCRETING.

TWICE THIS SPRING the Ohio River went on a rampage and flooded a cofferdam enclosing the first stage of construction on New Cumberland Dam at Stratton, Ohio.

The first time was the worst. Toward the end of January the cold weather unexpectedly broke, and thawing snow swelled the river's flow. As the river rose, huge blocks of ice, some almost

as big as trailer trucks, swept downstream in a roaring rush.

When the water rose to within a few feet of the top, the contractor, Dravo Corp., Pittsburgh, knocked open the timber bulkhead closing off the floodgate, and deliberately flooded the cofferdam. They knew that sooner or later the river would rise above the top (it eventually reached a high of 8 ft above the cells), and

they wanted to prevent as much scouring of the material filling the cofferdam cells as possible.

All work stopped for two weeks. No sooner had the job started again after the cofferdam was dewatered than another flood came along. This second one wasn't so bad. It held them up only about a week.

Fortunately neither flood caused much damage. Blocks of ice and runaway barges tore up the rails set on top of the cofferdam cells, but except for some dents in the sheetpiling, the cofferdam held up well.

Dravo figured the cofferdam would probably flood once during the spring flood season. But they didn't figure on it happening twice. Even so the delays caused by the floods have not put the job seriously off schedule. Good management and methods have about made up for the lost time already.

Why not build the cofferdam high enough to prevent flooding? Dravo wanted to keep the diameter of the cofferdam cells as small as possible. The plans originally called for 70-ft-dia cells, but Dravo convinced the Corps of Engineers that 54-ft-dia cells would be adequate, and they won the bid on that basis. The smaller cells couldn't be brought up high enough to match the crest of a peak Ohio River flood, but the savings in cost more than balances the inconvenience and delay.

The 1,315-ft-long, high-lift dam consists of 11 bays, each with an electrically operated tainter gate. Total height of the dam will be 115 ft. Each of the 110-ft-long gates is set between piers that support a steel plate girder service bridge. A crane will run along tracks on the bridge to raise and lower bulkheads and make emergency repairs.

The over-all plan calls for construction of the dam in three stages. First the four bays on the Ohio side, next to the two locks nearing completion on that shore, will be built within the first stage cofferdam. Then the contractor will move to the opposite side to build an identical four-bay section. Finally, the three bays closing the middle of the dam will be constructed.

Dravo started work on the first stage cofferdam as soon as they arrived on the job last summer. Inside dimensions of the cofferdam are 195x540 ft. Two derrick

THEY MADE MONEY ON FLOODS... continued

boats equipped with piledriving rigs drove the 19 sheetpile cells that make up the cofferdam. It took about two months to complete the cofferdam.

Excavation began as soon as the first cells were driven. Two other derrick boats, both rigged with 2-yd dragline buckets, dug out sand, silt, and gravel from the cofferdam area and placed it in the completed cells as fill.

The contractor had to remove 10 to 15 ft of material from the river bottom to reach rock. Total excavation on the job amounts to about 300,000 yd. It includes only a small amount (10,000 yd) of rock.

Dravo completed excavation soon after driving the last cell to close off the cofferdam. Then they set three 15-in. American vertical turbine pumps to work emptying the water from the cofferdam. Dewatering took about one week.

One 4-in. pump operating only half time has been enough to keep the cofferdam dry during subsequent construction. Seepage accounts for only about 100 gpm of the outflow. But waste curing and cooling water applied to the exterior of the mass concrete boosts the pumping rate to about 400 gpm.

Slab Supports Gantry

First operation within the dewatered cofferdam was placing a 3 to 5-ft-thick concrete slab on top of the exposed rock along the entire length of the downstream side. This slab serves as a base for rails carrying a 50 ton gantry crane. Two whirler cranes, traveling on rails on top of the cofferdam cells, handled concreting of the slab and gantry erection.

The gantry crane is an American Revolver R20 with 140-ft boom. It handles dam concreting. One of the two whirler cranes up on top of the cells also is a 50-ton capacity American. The other is a 35-ton contractor-built rig. These two take care of placing forms and reinforcing.

The base of the dam consists of a block of concrete 85 ft thick and 40 ft high from rock to the top of the spillway crest. The mass concrete in the base is brought up in 5-ft lifts. Blaw-Knox cantilever forms carry the concrete up. The contractor waits a minimum of



FIRST LIFT—Workmen dump concrete from 2-yd bucket to start pour in section of dam base. Blaw-Knox cantilever forms bring concrete in massive base up in 5-ft-high lifts.

five days between superimposed lifts.

On top of the mass concrete base, 10-ft-wide piers rise as high as 75 ft above the crest of the spillway. Timber forms fabricated at a carpenter shop a short distance downstream hold the concrete for the piers. Lower lifts on the piers are 5 ft. But in the upper levels, where the thickness of the piers narrows considerably because of the tapering up and downstream faces, lifts increase to a maximum of 10 ft.

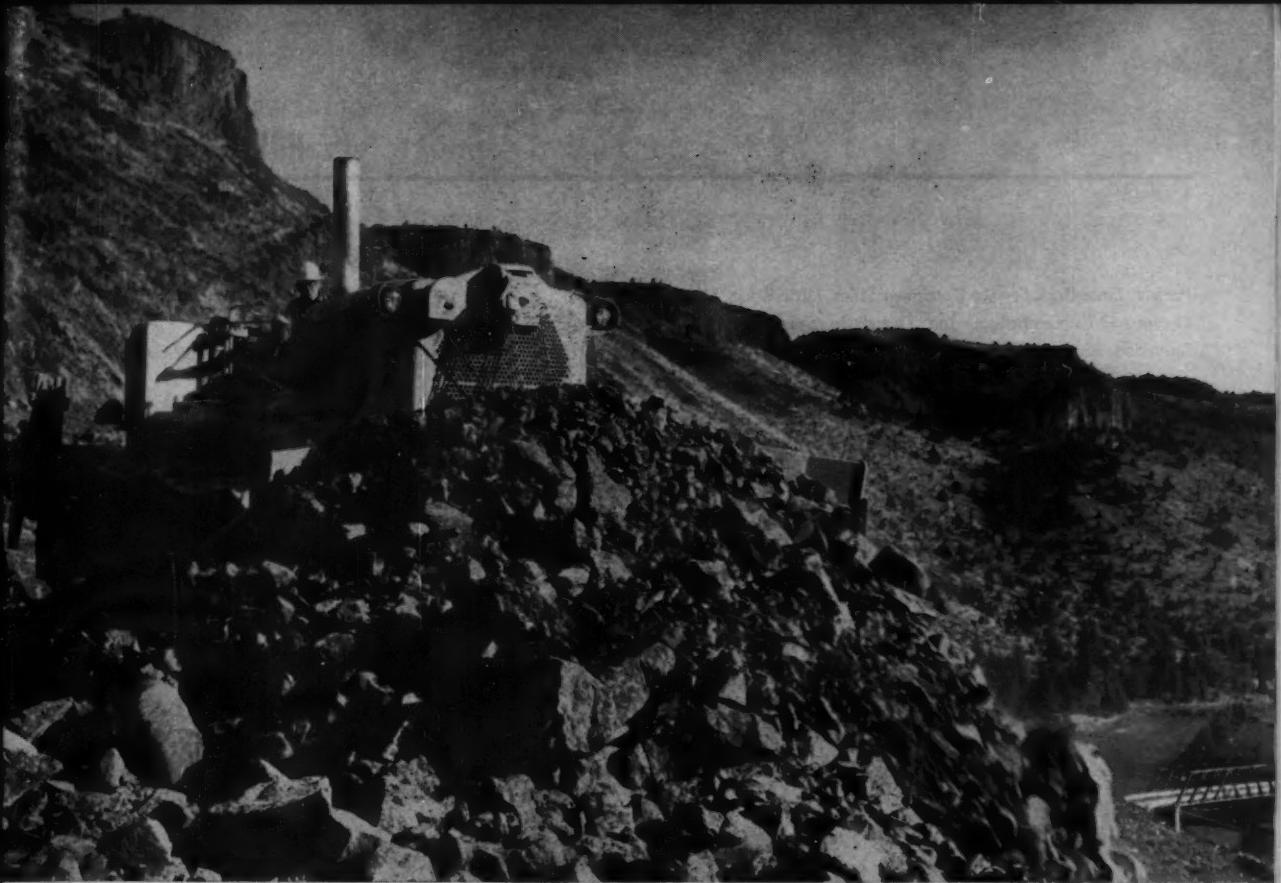
The job calls for 170,000 yd of concrete. A barge-mounted batch plant with two 2-yd T. L. Smith mixers produces all the concrete.

Capacity of the plant is 80 to 90 yd per hour, but here production averages 50 yd per hour.

The gantry crane places the concrete with a 2-yd bucket. The concrete plant moves up and down along the downstream side of the cofferdam and positions itself opposite the pour, within easy reach of the gantry. The gantry doesn't have to travel along its track during a pour. It simply swings back and forth between barge and dam.

While pouring the mass concrete in the base of the dam, the contractor's crew worked around the clock. They placed as much as 800 yd in one 24-hour day. Work

continued on page 85



TAKE-CHARGE D9

—ONE BIG REASON KEYSTONE MET AND EXCEEDED PRODUCTION SCHEDULES!

This giant Cat D9 Tractor with No. 9S Bulldozer and No. 9 Ripper is working on the Prineville Dam—Crooked River Project about 20 miles S.E. of Prineville, Oregon. Here it is busy on the side-hill excavation of a 3,000-foot-long access road. Says Project Manager Art Chinn of the Keystone Construction Co. Inc. & Associates: "We are meeting and exceeding expected production schedules. Our D9 was bought primarily to pushload DW21s, but we also find it a high producer on other jobs."

That's the key to this take-charge giant's value—high production. Whether 'dozing, ripping or pushloading, the D9 has the capacity to handle *more* work with *less* down time at *lower* operating cost than any other earthmover. Many features contribute to its ability to get a lot of work done fast day after day. Here are just a few:

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For your big jobs, you can't beat a D9. And you can't beat the backing you get from your Caterpillar Dealer. He's ready round-the-clock to help you meet and whip production schedules with prompt service. See him for complete information about the D9, available with direct drive or torque converter. Ask him to demonstrate this giant on your job.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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HOW TO HANDLE WET JOBS

#49 of a series

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Contractor: Forcum-Lannom Inc., Dyersburg, Tenn.

Engineers: Burns & McDonnell, Kansas City, Mo.



Control 30 ft of ground water in coarse sand as wellpoints . . .

Keep Deep Cut Dry Close to Rising River

In pervious sand near the Arkansas River, Forcum-Lannom required a deep excavation going down 30 ft below ground-water table. Prior experience had indicated the area to be a difficult one for dewatering by the wellpoint method. A high pumping head, long discharge lines and a rising river level were among the problems.

- Photo shows what happened. The contractor had clear

sailing as a 2-stage wellpoint system designed by Griffin engineers kept the excavation safe and dry. The lower-stage pumps pushed the water vertically a distance of 45 ft and then through 600 ft of discharge pipe to the river.

- Ground water was held below subgrade through 7 months of continuous pumping, with river level fluctuating 10 ft.

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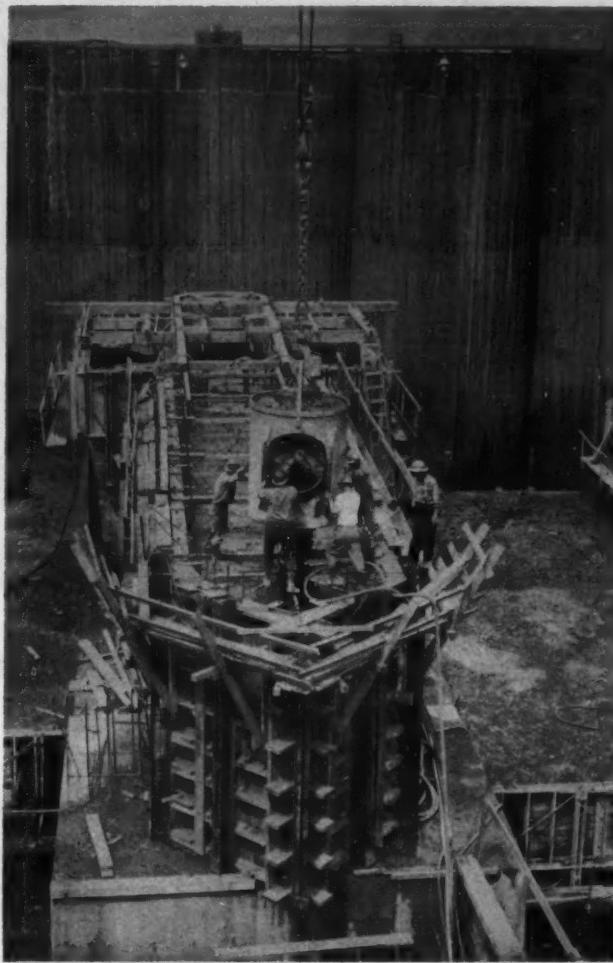
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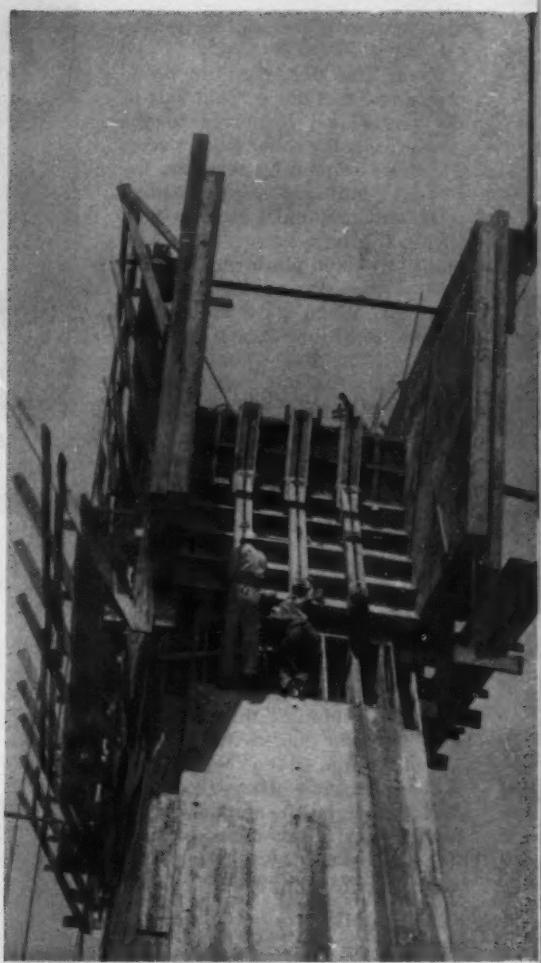
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THEY MADE MONEY ON FLOODS... *continued*



PIERS RISE ON BASE—Timber forms fabricated at carpenter shop downstream hold concrete for 10-ft-wide piers that separate dam into bays.



CRANE SETS PIER FORMS—Bracing at bottom of panels holds timber scaffolding that supports workmen.

on the piers goes slower because of the more complex forming, and during this phase Dravo only works one shift a day.

Aggregate for the bottom 20 ft of the mass concrete is gravel dredged from the river bottom. Specs call for crushed limestone for the rest of the concrete. This comes to the job on barges from a commercial quarry 40 miles upstream. While waiting to be unloaded into the storage hoppers of the concrete plant, the barges tie up at a dock just below the dam on the West Virginia side.

Final step in construction of the dam structure proper is erection of the huge tainter gates in each bay. These gates, fabricated by Nashville Bridge Co., arrive at the site on barges. Each gate is made

up of five sections that range in weight from 29 to 38 tons. Typical size of a gate section is 20x22 ft. The gates are mounted on 43-ft-long triangular steel side frames that pivot on trunnions set into a step on the downstream face of the piers. Hoisting machinery in each pier operates the gates.

Platforms Hold Crane

Gates in the three center bays of the dam and one at each end will be submergible types. Water can pass either over or under them, depending on their position. The remaining six gates will be non-submergible. They can only be raised, permitting the river's flow to pass under them.

To position the 50-ton American Revolver crane that runs

along the top of the cofferdam cells so it can handle erection of the gate sections, Dravo built two steel platforms that jut out from the inside face of the cells. Each platform consists of four steel posts—a short pair at the rear resting on top of the cofferdam cells, and a 30-ft-long pair in front seated below on the concrete sill of the dam. The posts hold two 40-ft-long steel beams that carry rails for the Revolver crane to run out on.

The platforms extend the reach of the crane enough so that it can place the gate sections without trouble. First it reaches out over the side of the cofferdam to pick a gate section out of the barge; then it swings the section over the cells and moves out onto the

THEY MADE MONEY ON FLOODS ... continued

platform to place the section in the bay.

From one platform the crane erects two sections on that side of the bay. Then it moves to the platform on the other side to erect the three remaining sections. Instead of building only one platform and moving it step-by-step across the bay, Dravo settled on using two fixed platforms to avoid loss of time in moving and setting up. When gate erection is completed in one bay they move the platforms to the next bay and proceed in the same way.

The design of the gates on this dam includes an unusual feature. Anchor rods that hold the girder seating the gate trunnions are prestressed. In each pier 32 rods set deep into the concrete are post-tensioned with hydraulic jacks to carry a load of 50 tons. The stressing system is the patented Stressteel method.

First stage construction is now about 70% complete. Dravo plans to start the second stage of construction sometime this fall. They have already placed two cells on the other side of the river to protect the bank from scouring. While work on the second stage is under way, part of the river's flow will pass through the open gates of the completed first section.

Sheetpile sections cast into the piers at the ends of the first two stages will tie the third-stage cofferdam, at the center of the dam, into the completed parts of the structure.

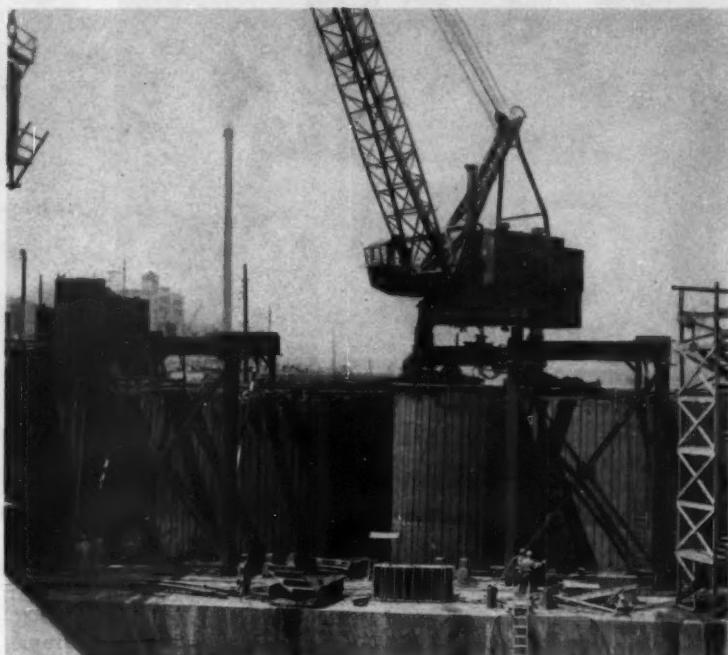
After completion of the first stage, current through the gap in the center will be too strong for barges heading upstream to buck against. By that time the lock on the Ohio side of the river will be ready for use, and all traffic will pass through it.

Two Sets of Labor Rates

An interesting sidelight on the job is the fact that it is split in two. The contractor took advantage of lower union labor rates in West Virginia by setting up their headquarters there and running the bigger part of the job from that side. The state line runs near the Ohio shore, close to the edge of the lock wall. So all 11 bays in the dam are on the West Virginia



CONCRETE PLANT—Crane mounted at rear of barge charges aggregate bins of concrete plant with clamshell. Airlift running up side of plant shoots cement into hopper.



TWIN PLATFORMS—Revolver crane moves out onto steel platform to erect tainter gate sections. Double carriage underneath crane permits rig to switch directions in travel.

side. A small section on the Ohio side—two piers that carry the service bridge over the locks—is set up as an entirely separate job.

The dam is one of 21 proposed projects, all of the same general type as New Cumberland, that the Corps of Engineers eventually will build to modernize navigational facilities on the upper Ohio River. Dravo's contract totals

\$13.5 million. The dam is scheduled for completion in 1961.

Men on the Job

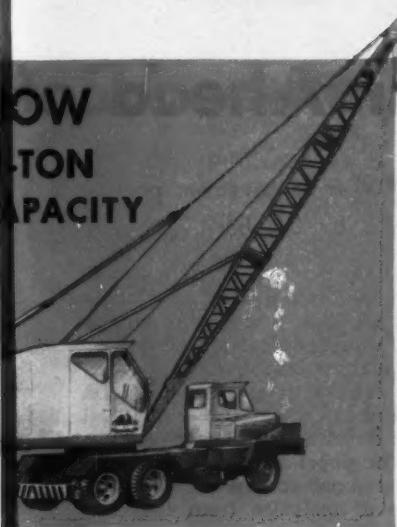
Project Manager Bill Huysman heads the field staff for Dravo at the site. Art Archer is field superintendent; C. E. Moulton is chief engineer. In charge of the office crew is George Baney.

Resident engineer, Corps of Engineers, is Roy W. Klingebiel.



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verter . . . three different boom hoists . . . house-type or all-vision cab.

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America's most modern crawler—with highest earnings for its size. Check BANTAM C-350's surprising work speed and ease. Full-reversing, 2-speed transmission and digging lock with in-cab control are standard. Digs to 18'10" with new, optional long-boom back hoe. New, hydraulically actuated backhoe bucket (shown) ruses toughest digging jobs. Capacity to 8 tons. Also see new BANTAM CR-350 self-propelled—versatile contractor's tool for digging, lifting, handling, stockpiling jobs. 11-ton capacity.



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HARD-WORKING PAVER—Koehring 34E paver dumps load of concrete for top course in front of spreader. Single paver does two

jobs. First it places 100-ft stretch of bottom course, then it doubles back after crews lay fabric reinforcing to place the top course.

Paving a Full Year Ahead of

They've got it made. With one paver they're averaging 2,000 ft of pavement per day. By adding another they'll double that rate and clean up job by October.

POLISHING OFF a \$13-million expressway project a full year ahead of schedule is a record that makes a 4-min mile seem slow. But Merritt-Chapman & Scott Corp. are confident they'll pull off this feat on their 5-mi section of the Cross Westchester Expressway in New York.

Their target date for completion is this October. Earthmoving is virtually complete now, and they have made a good start on the paving. They've put down 15,000 yd of the total 75,000 yd of concrete that the job calls for.

So far they have been averaging about 2,000 ft of 12-ft-wide lane per day with just one paver. They plan to add another paver to the train this month and double their production. One paver will handle the 6-in.-thick bottom course; the other will take care of the 3-in. concrete cover on top

of the welded wire fabric reinforcing.

As the paving train is set up now, a Koehring 34E paver dumps concrete in front of a Blaw Knox spreader that strikes it off to a 6-in. depth and vibrates it. Then workmen place the sections of reinforcing fabric on top of the leveled concrete. When the first course extends a distance of 100 ft (the interval between transverse construction joints), the paver moves back and starts the top course.

Two converted bottom dump wagons—one an Allis-Chalmers and the other a Euclid—supply water to the paver. Capacity of each is about 3,000 gal.

After the spreader levels off the top course and vibrates it, a Jaeger double screed transverse finisher strikes off the concrete flush with the top of the forms.

Then follows a Koehring longitudinal float. A workman with a long-handled float touches up.

Finally a burlap drag gives the concrete a rough texture, and workmen cover the completed stretch with Sisalkraft paper. Top of the paper is colored white to reflect heat and reduce evaporation of moisture from the concrete. Curing period is five days. Forms are stripped the day after pouring.

Concrete comes to the job in dry batches from a local concrete plant. A fleet of 12 Mack trucks feeds the paver. Each truck carries seven batches. Haul distance from the plant to the job averages 3 to 4 miles. A round trip, including time waiting at the job to unload, takes about 40 min.

It's unusual on a job of this size for the contractor not to set up *continued on page 92*



PLACING FORMS—Workman with pneumatic hammer powered by truck-mounted Ingersoll-Rand compressor drives pins to hold forms.

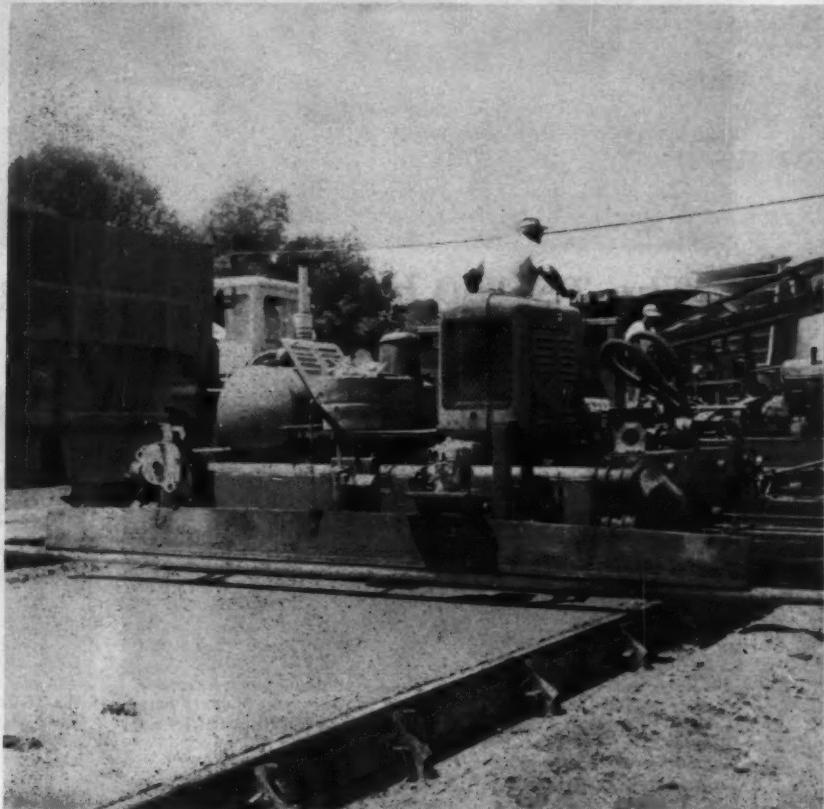


FINISH GRADING—Paving forms serve as rails for Gar Wood-Buckeye subgrader that strikes off base to $\frac{1}{4}$ in. of final grade.

Schedule



IN ONE END—Batch truck delivers seven batches per trip from commercial plant.

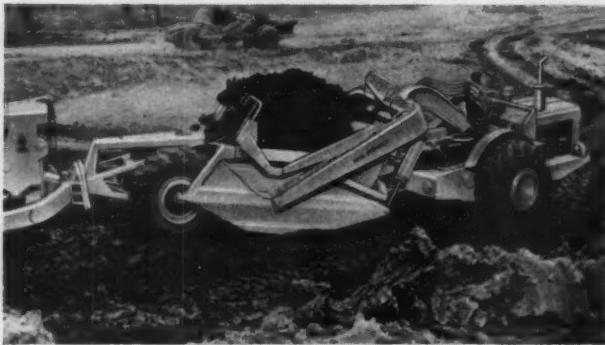


OUT THE OTHER—Paver heaps concrete evenly to make it easy for spreader.

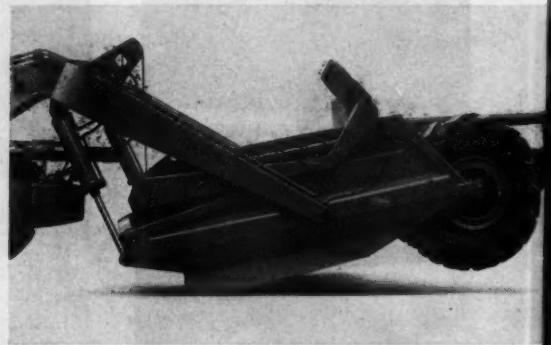
VIBRATES TOP COURSE—Mounted at rear of Blaw-Knox spreader, Stow vibrator consolidates top course before transverse finisher goes over surface with double screeds.



The TS-260 has powered its way into leadership.



The TS-260's 230 horsepower provides more than 18 horsepower per struck yard... 30,000 pounds of rimpull at 1.9 mph.



The TS-260 is the only scraper in its class to offer positive down pressure on the cutting edge for fast, easy penetration into hard-packed materials.

...move ahead with

THE ALLIS-CHALMERS TS-260

Eats Up Big Yardage Faster than Anything in its Class

All over America, the 17-cu-yd TS-260 in action is convincing construction men that here's the top dirt hog in the medium-sized motor scraper field. It'll convince you, too—with its profit edge in horsepower, rimpull and exclusive positive penetration at the cutting edge.

One of the most commanding features of the TS-260 is its new Allis-Chalmers 16000 engine. This big, new power package delivers 230 horsepower at 2,000 rpm . . . more than 18 horsepower per struck yard of capacity . . . up to 12 percent more than most other units of comparable size. The 16000 engine also offers unmatched efficiency and fuel economy—result of controlled turbulence produced by a combustion system unique in the construction machinery field. There's over 30,000 pounds of rimpull in low gear . . . up to 25 percent more pull than others in

the 15-yard class at normal loading speeds.

Only Allis-Chalmers offers positive hydraulic down pressure on the cutting edge. In the loading cycle, this means fast, easy penetration even into hard-packed material for big 17-cu-yd loads. Double-acting scraper jacks also provide full power for rapid lifting of loaded scraper bowl. Result—faster getaways for loaded scrapers, faster work cycles.

When the ground gets soft or muddy, KON-TORK differential automatically goes to work shifting power from the wheel that slips to the wheel

that grips . . . enables the TS-260 to walk right through axle-deep mud if it has to. KON-TORK differential also permits normal steering and complete control of the unit when varying torque is being delivered to drive wheels.

The TS-260 is loaded with other important performance and production advantages, too. Original, low, wide bowl with curved bottom reduces loading resistance . . . speeds loading cycles. Smooth 90-degree turning ability permits 180-degree turns in less than 31 ft . . . an air-actuated transmission brake lets operators upshift swiftly and surely without double clutching.

Your Allis-Chalmers dealer will be glad to show you all of the high-performance features on the TS-260 . . . and to prove their worth in an actual demonstration on your job. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

p... in performance, dependability, profit for its owners



When the going gets tough, KON-TORK differential automatically shifts power from the wheel that slips to the wheel that grips . . . keeps the TS-260 moving through the mudiest going.



TS-260

17-cu-yd heaped
230 horsepower
44,800 lb

KON-TORK is an Allis-Chalmers trademark.

ALLIS-CHALMERS...power for a growing world

PAVING AHEAD OF SCHEDULE... *continued*

his own batch plant. But on this job MC&S found they couldn't beat the price offered by a large local concrete supplier.

MC&S figured carefully what it would cost to batch their own concrete, and it turned out to be an expensive proposition. They would have to get access to a wharf on Long Island Sound to bring in aggregate and cement on barges, then haul through congested city streets (the area is a heavily built-up residential section) from the waterfront to the job site.

All things considered it turned out to be much more profitable to buy batches from the commercial plant. It can handle the job easily. So far delays in delivery have been negligible.

The contractor on the adjoining section of the new expressway, Russiano & Del Ballo, are buying batches from the same supplier, but he has set up a special plant on their job.

Fine Grading

The crew preparing the subbase



FINISHER—Jaeger double screed finisher strikes off excess concrete in top course.



FLOAT—Koehring longitudinal float, last mechanized unit in train, polishes off job.

keeps at least 1,000 ft ahead of the paving train. Workmen place the steel paving forms by hand after the 12-in.-thick gravel base has been leveled with a grader. A pneumatic hammer powered by a truck-mounted Ingersoll-Rand compressor drives the form pins home.

A Gar Wood-Buckeye fine grader travels along the forms and skims off the base to within $\frac{1}{4}$ in. of final grade. Then a small flat-wheel roller compresses the material the final fraction. When the transverse joints are set in place between the forms, everything is set for the paving train to roll ahead.

The MC&S job is one of three sections of six-lane divided expressway that will link the New England Turnpike and the New York State Thruway. Completion of the expressway is scheduled for the fall of 1960.

Superintendent in charge of the job for MC&S is Tom Donovan. Roger Chapman is project engineer. Paving superintendent is Charles Harris.

More capacity...size for size!

Crosby-Laughlin Load-Rated® Shackles

*Designed to new
safety standards*

- Heat treated alloy pins
- Guaranteed capacity
- 50% stronger than ordinary shackles
- Safe working load forged in every shackle

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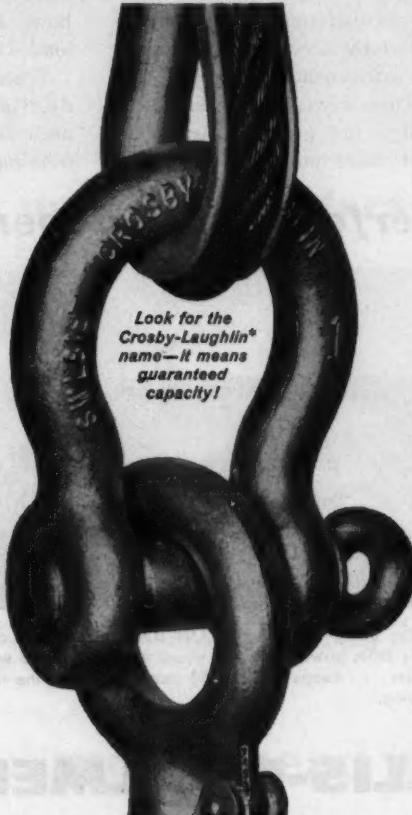
Write for FREE specifications catalog listing the most complete line of drop forged fittings for wire rope and chain.

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Manufacturers of Crosby Clips and "Load-Rated" Blocks . . . Crosby-Laughlin "Load-Rated" Fittings . . . Lebus Lead Binders and Snatchblocks.



Look for the
Crosby-Laughlin®
name—it means
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capacity!

NOW the EUCLID "TWIN" Scraper has EVEN MORE POWER* and WORK-ABILITY!

***Now 563 total h.p.!**



No other scraper gives you all the features you get in the TS-24 "Euc"

**2 engines—
563 total h.p.
2 Torqmatic Drives
No spin differentials
All-wheel drive
32 yds. heaped
(24 yds. struck)
27.00x33 tires
(33.5x33 optional)**

Euclid's TS-24 Scraper, with power increased to 563 h.p., now widens its lead in performance over every other scraper in the field. With a 336 h.p. engine in the tractor and 227 h.p. at the rear, this "Twin" is unsurpassed in productive capacity.

On job after job—small grading work to big yardage projects—the TS-24 Twin-Power "Euc" moves dirt at lower cost than other scrapers.

Its big power, big capacity and big performance has helped contractors, mines, quarries and industrial users to beat the pinch on profits.

Have a Euclid dealer show you how the "Twin" can bring a better return on investment...on your present or future work. He'll give you all the facts and can probably arrange a demonstration for you.

EUCLID Division of General Motors, Cleveland 17, Ohio

Watch for Euclid's Big 3 Power Parade in your area!



EUCLID EQUIPMENT

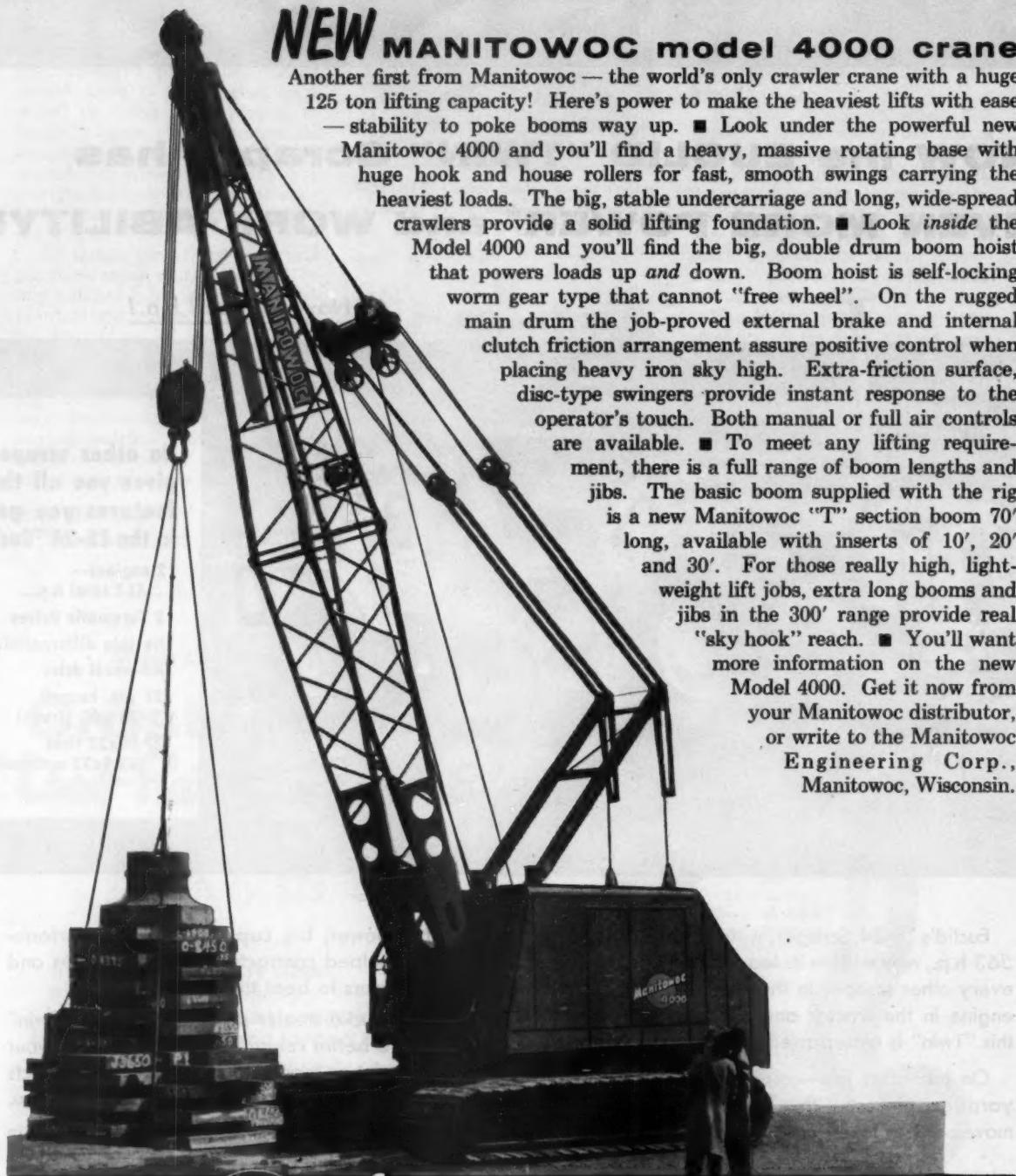
FOR MOVING EARTH, ROCK, COAL AND ORE

125 TONS at 17' radius

Greatest lift capacity on crawlers

NEW MANITOWOC model 4000 crane

Another first from Manitowoc — the world's only crawler crane with a huge 125 ton lifting capacity! Here's power to make the heaviest lifts with ease — stability to poke booms way up. ■ Look under the powerful new Manitowoc 4000 and you'll find a heavy, massive rotating base with huge hook and house rollers for fast, smooth swings carrying the heaviest loads. The big, stable undercarriage and long, wide-spread crawlers provide a solid lifting foundation. ■ Look *inside* the Model 4000 and you'll find the big, double drum boom hoist that powers loads up *and* down. Boom hoist is self-locking worm gear type that cannot "free wheel". On the rugged main drum the job-proved external brake and internal clutch friction arrangement assure positive control when placing heavy iron sky high. Extra-friction surface, disc-type swingers provide instant response to the operator's touch. Both manual or full air controls are available. ■ To meet any lifting requirement, there is a full range of boom lengths and jibs. The basic boom supplied with the rig is a new Manitowoc "T" section boom 70' long, available with inserts of 10', 20' and 30'. For those really high, light-weight lift jobs, extra long booms and jibs in the 300' range provide real "sky hook" reach. ■ You'll want more information on the new Model 4000. Get it now from your Manitowoc distributor, or write to the Manitowoc Engineering Corp., Manitowoc, Wisconsin.



Manitowoc

MANITOWOC ENGINEERING CORP.

(A subsidiary of The Manitowoc Company, Inc.)

MANITOWOC, WISCONSIN

CRANES
25 TON - 125 TON

SHOVELS
1½-YD. - 5½-YD.

DRAGLINES
1¼-YD. - 6-YD.

TRENCH HOES
1¼-YD. - 3-YD.



Heavy jobs like this are easy for the big new Cat No. 14 Motor Grader, working here on a section of Interstate Highway System near Corsicana, Texas. Owner: T. L. James & Co. Inc. and R. W. McKinney, Corsicana.

MOST VERSATILE BIG GRADER EVER DEVELOPED

—NEW 150 HP CAT TURBOCHARGED NO. 14!

The first and only Turbocharged Motor Grader, the big No. 14 delivers high production at low operating cost both on the roughest and finest grading work. It packs 150 HP and 29,280 lb. heft to handle heavy work quickly. Operates at the highest practical working speeds with either a 12-ft. or 14-ft. moldboard. You don't have to pick "spots" to make it pay off. You can use it profitably on many different applications such as:

—power applications like heavy grading, ditching, rough grading, bank sloping. Its low center of gravity provides extra blading and machine stability.

—control applications like light spreading, surface maintenance, fine grading and light blading. With Preco Automatic Blade Control, it controls blade slope within $\frac{1}{8}$ in. in 10 ft.—cuts fine grading time in half.

PAYOUT FEATURES OF THE NEW NO. 14 — Plus exclusive oil clutch, power steering and power brakes, tubeless tires, extra strength frame, unequalled visibility and many other features.

NEW DRY-TYPE AIR CLEANER. Removes 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Cuts maintenance time by up to 70%. Extends engine life.

NEW TURBOCHARGED CAT ENGINE. Turbocharger utilizes waste energy from engine exhaust to increase efficiency and economy. Engine provides high torque rise that pays off on the job.

Some of its many new features are shown here. For the complete picture, see your Caterpillar Dealer listed in the Yellow Pages of your telephone directory. Ask him for a demonstration. Pick the toughest applications you can find—see for yourself how the big, versatile No. 14 can handle any kind of hard work!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

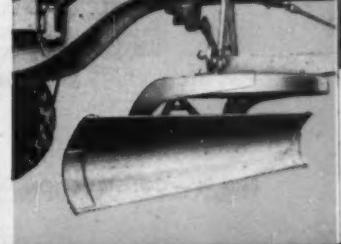
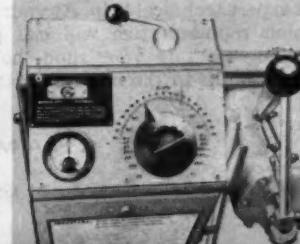
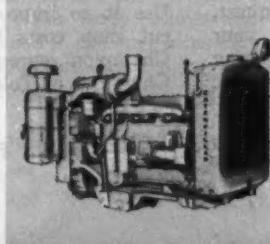
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BIG NO. 14—
BORN OF RESEARCH
PROVED IN THE FIELD

PRECO AUTOMATIC BLADE CONTROL. Optional. Operator selects desired slope on dial. Now transistorized, unit automatically controls blade slope within $\frac{1}{8}$ in. in 10 ft.

HIGH THROAT CLEARANCE. New design permits increased clearance between moldboard and circle for greater loads. Also extra-strong frame, circle and drawbar.



Use this Champion "know how" to improve ignition performance and cut shop costs in your fleet



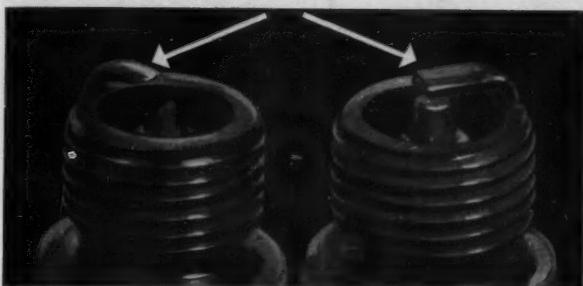
Champion representative points out to fleet mechanic a distributor cap that was causing rough engine operation. (See Service Tips)

EXCLUSIVE TECHNICAL HELP

To help your fleet get the best and most economical spark plug performance, Champion offers this expert technical help. At your request, a Champion representative will call on your fleet. Working right in your shop, he'll bring your mechanics up to the minute on the latest

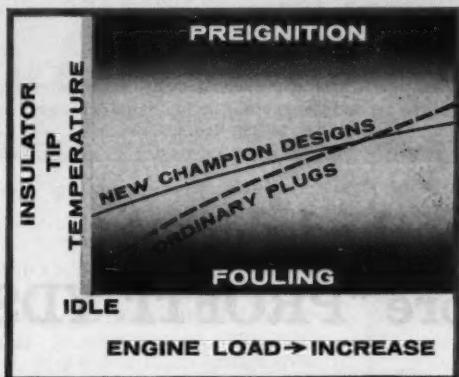
technical "know how" from Champion, the world's largest organization devoted exclusively to spark plug development. This exclusive technical help is available free from Champion. Use it to improve ignition performance and cut shop costs in *your* fleet. Just call your Champion representative or supplier, or write Champion at Toledo 1, Ohio.

CHAMPION SPARK PLUG COMPANY



MAXIMUM LIFE

Both of these spark plugs were run for the same length of time in an engine operated under heavy hauling conditions that pushed combustion chamber temperatures up into the critical ranges. See how Champion's Powerfire electrode (R.) outlasted the other! That's why you get better performance *longer* with Champion spark plugs.



WIDER OPERATING RANGE

This graph shows you how Champion's wider operating range allows Champions to run *hotter* at low engine speeds to fight fouling, *colder* at high speeds to guard against pre-ignition and excessive electrode wear. For the best possible performance at all speeds, in all your engines—install Champion spark plugs.



QUALITY CONTROL

The quality of every Champion 5-rib ceramic insulator is guarded by 1,666 inspections! In this control center, technicians make sure that proper temperatures and pressure are constantly maintained in the huge kilns that fire and harden Champion insulators—assuring you of the same top quality in *every* Champion spark plug.

CHAMPION

Service Tips

for better engine performance

CHECK THOSE DISTRIBUTOR CAPS

Too often it's assumed that distributor cap towers don't wear out, and consequently they are not checked as often as they should be.

One of the biggest causes of early cap failure is an ignition lead not pushed snugly into the tower. The arcing that occurs produces high resistance corrosion at the terminals. If it is allowed to continue long enough, it eventually destroys the surrounding insulation. (See photo



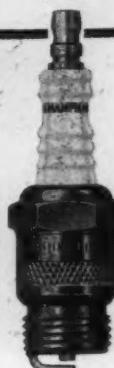
above.) Unfortunately, the rubber boots over the towers usually collect a generous coating of grease and road dirt which effectively hides this potential source of ignition failure unless careful examination is made.

And while you have your hands on the distributor cap, be sure to see that it is seated properly on the distributor body. If the cap is cocked, it will cause the engine to run roughly and eventually break the rotor.

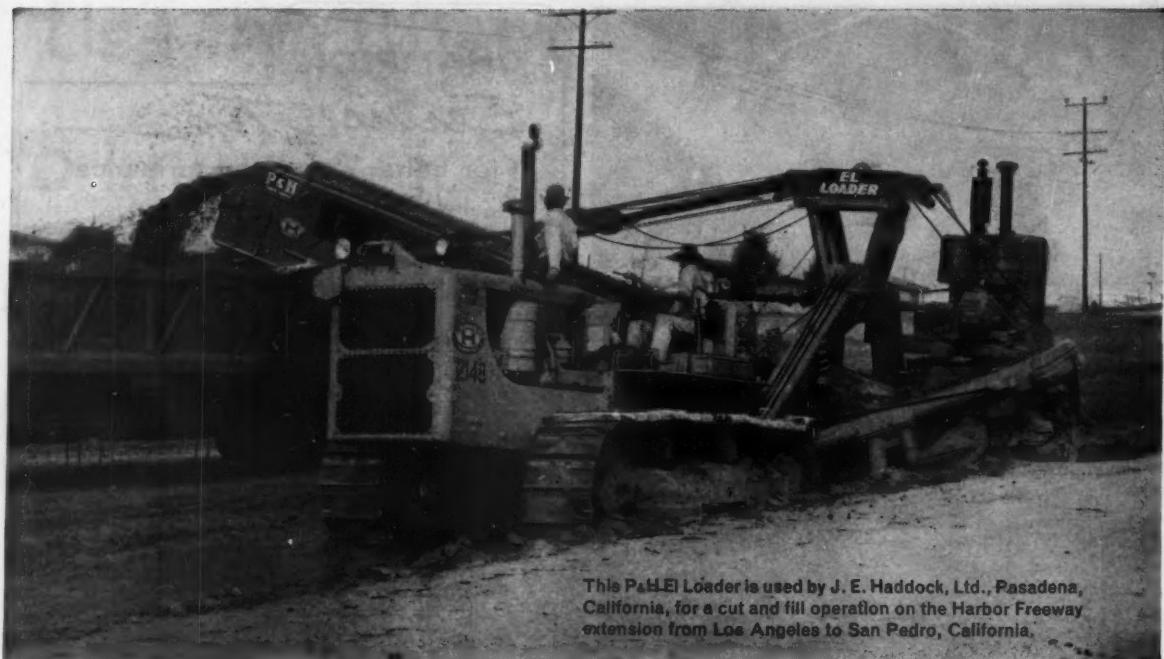
18 OF 21 TRUCK
MANUFACTURERS INSTALL

CHAMPION

SPARK PLUGS



TOLEDO 1, OHIO



This P&H El Loader is used by J. E. Haddock, Ltd., Pasadena, California, for a cut and fill operation on the Harbor Freeway extension from Los Angeles to San Pedro, California.

The **P&H** EL LOADER method does a better job, faster...for more "PROFIT-YDS."

Earth moving contractors using the P&H method of loading with the P&H El Loader are loading dirt cheaper than any other method known. They are getting outstanding economy because the El Loader provides unusual maneuverability for faster loading . . . because the positionable conveyor provides them with the versatility that permits loading any type of hauling unit . . . because one man, the tractor operator, handles all three operations . . . raising and lowering the cutting disc and conveyor assembly and operating the conveyor belt.



51" clearance is provided between the conveyor belt and plow beam, and a clearance of 36" between conveyor and main frame, when conveyor is at maximum loading height. This provides ample clearance to handle maximum volume of material.

Check these features that make the C-30A Model P&H El Loader a profit-making investment for you:

1. One-man operation from bank to any hauling unit.
2. Stratified soils can be mixed and blended to a maximum depth of eight feet.
3. Troughing-type conveyor belt is 48" wide to provide maximum loading capacity.
4. Operator can raise conveyor to clear a height of 13 feet.
5. Loads 500-1200 cubic yards per hour—side casts 1000-2000 cubic yards per hour.
6. Easily and quickly dismantled and transported.

The versatility and ruggedness of the P&H El Loader make it applicable for earth moving in any terrain where scraper loading can be done. Combining this with the most economical use of power, the P&H method of loading does a faster job, better and, at the same time, helps you to "Profit-Yards" every foot of the way.

For complete, accurate cost analysis on your job, write Dept. 522B, Harnischfeger Corporation, Construction & Mining Division, Milwaukee 46, Wisconsin.

THE P&H LINE:

Truck Cranes 10 through 70-ton capacity
Crawler Cranes 20 through 100-ton capacity
Excavators $\frac{1}{2}$ yd. through $3\frac{1}{2}$ yds.
Soil Stabilizers from 8 through 12-foot widths—compacted thicknesses from 7 through 12 inches.



HARNISCHFEGER
Construction & Mining Division
Milwaukee 46, Wisconsin



DELIVERY—A 40-ton Colby whirler crane with 120 ft of boom scoops aggregate from barge with a 3-yd clamshell and deposits it into a cofferdam for the bridge pier.



MEASURING—Workman takes sounding to assure that aggregate is level and at grade.

Grout Seals Pier Foundations

The contractors needed a whirler crane to place the aggregate, but the heaviest piece of equipment needed for concreting was a 6-yd ready-mix truck.

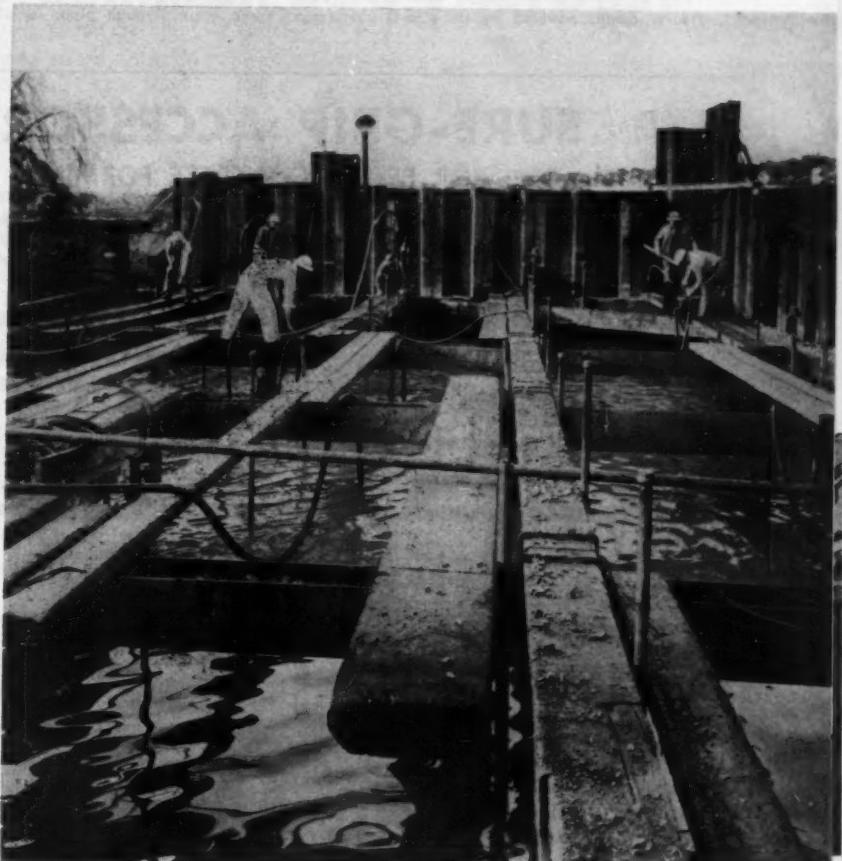
PREPAKT CONCRETE greatly reduced heavy equipment requirements for sealing the underwater foundations of two main piers of a \$15-million bridge over the Lake Washington Ship Canal in Seattle.

Scheumann & Johnson of Seattle had to bring in a 40-ton Colby whirler crane to place the aggregate, but they produced about 3,500 yd of concrete in 40 hr of actual pumping time for each foundation with no equipment heavier than a 6-yd ready-mix truck.

Cofferdams for the two piers were located adjacent to the shore lines. This afforded ready access to both pier locations by barge on the water side and by truck on the land side.

Each 48x112-ft cofferdam area first was laced with 1½-in. grout pipes set upright on 8-ft centers, tied to overhead timbers, and lowered to a depth just off the excavated bottom. Slotted 2-in. pipes were set on 20-ft centers. These were sounding pipes that allow grout to enter the pipe but not the aggregate.

Washed ¾ to 3-in. aggregate was placed in the area by the whirler crane with 120 ft of boom and a 3-yd clamshell bucket. The whirler was mounted on a steel barge. Six shifts were required for each foundation. Checks were



GROUTING—Grout runs off three wye connections through six 1½-in. lines of hose and down vertical grout pipes to fill voids in aggregate, forming a 5,000-psi concrete.

GROUT SEALS PIER FOUNDATIONS . . . *continued*



PUMPING—Transit-mix trucks dump intrusion grout into three grout mixers. Three Gardner-Denver pumps powered by three G-D compressors force grout through pipes to piers.

taken to keep the aggregate level to correct grade for a seal 17 ft deep.

Intrusion grout was mixed in a ready-mix plant a mile from the site and delivered by truck to three 2½-yd intrusion grout mixers at the job site. Three Gardner-Denver FG grout pumps forced the grout through 2-in. pipes about 110 ft long that wye'd off along the transverse centerline of the cofferdam. Three wye connections on the 2-in. pipelines led to six 1½-in. hoses that delivered the grout directly to the imbedded pipes in the aggregate to fill the voids and form a concrete that attained a strength of 5,000 psi in 90 days. Two Gardner-Denver 600-cfm and one 365-cfm compressors supplied air to the grout pumps.

Soundings were taken periodically through the pipes to determine the depth of grout in the aggregate mass. The grout was composed of 5,580 lb of cement, 2,175 lb of Pozzolan, 9,680 lb of fine sand, 435 gal of water, and 70 lb of Intrusion-Aid.

Pick SURE-GRIP ACCESSORIES FOR BETTER CONCRETE FORMING

From one source . . . every accessory you need for accurate, safe and dependable concrete forming. They're made to save time . . . reduce your forming costs.

Dayton Sure-Grip accessories are accepted and specified by the nation's leading architects and engineers. National network of distributors assures prompt service.



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ADJUSTABLE SCREED CHAIRS



3000 LB. AND 5000 LB. SNAP TIES
1½" THROUGH 1 ½" COIL TIES
(STANDARD AND SCREW-ON CONES)



STANDARD AND SLIP-FIT
HANGER FRAMES



COIL HANGERS



OFFSET HANGER FRAMES



SLAB BOLSTERS
STUD RODS AND WASHERS
(NUT AND HANDLE)



SPECIAL SCREED CHAIRS

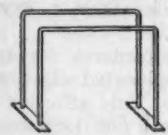


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Our detailing department will gladly help plan your forming requirements and layouts. Their years of experience, backed by one of the most

complete libraries of good forming practice in the country is your assurance of competent, cost saving recommendation.

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A Model 10-30 RD DUO-PACTOR equipped with 100 psi compactor tires, 84 inch steel roll, and hydraulic rear dump body for quick ballast adjustment, compacting to 95 per cent AASHO T99 on super elevated cloverleaf.

Wisconsin Interstate No. 94 Contractors smash compaction bottlenecks . . . with Seaman-Gunnison DUO-PACTORS!

Earth fill compaction at under 2 cents per cu yd, compaction time cut as much as 75 per cent! That's the record of four contractors holding five sections totaling 5,000,000 cu yd of fill on Interstate No. 94, Wisconsin state line to Milwaukee city limits.

This big reduction in compaction cost and time was obtained with Seaman-Gunnison DUO-PACTORS. Here's the story:

Rock bottom earthmoving bids plus rigid density requirements (AASHO T99) made fast, low-cost compaction imperative for Kramp Construction Company, R-W Construction Company, J. R. Griffith Company, and J. D. Boness, Inc. At the start, these contractors owned five DUO-PACTORS from previous jobs, plus a variety of other compaction equipment. Experience soon showed that the DUO-PACTORS obtained the required densities in *one-fourth the time*, with one-half to one-third the horsepower! By season's end, the DUO-PACTOR fleet had been increased to 11, used for all types of compaction—including fill, gravel base, and proof rolling.

If a compaction bottleneck is slowing down your job and cutting into profits, phone us today! A qualified Seaman-Gunnison representative will gladly help you work out procedures for lowest-cost, high-speed compaction with Duo-Pactor, Impactor, or TRI-PACTOR (Duo-Pactor plus impact vibratory). You'll sharply reduce both investment and operating costs!



A Model 6-19 DUO-PACTOR with 50 hp prime mover, and an 88-hp Model 10-30 RD with rear dump body, compacting rough fill—two of the three DUO-PACTORS owned by R-W Construction Co., Milwaukee, Wis.

Compacting gravel base. Combined action of DUO-PACTOR's rubber and steel rolls produced required density over a wider range of moisture. Model 9-27 DTR with trailing steel roll, one of three DUO-PACTORS owned by J. R. Griffith Co., Racine, Wis.



Seaman-Gunnison Corp.

Milwaukee 15, Wis., Tel: Orchard 1-0114

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- Street Flushers
- Tri-Pactor
- Utility Scraper
- Impactor
- Bituminous Distributors

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MANUFACTURERS & DISTRIBUTORS



Going up --- new highways, bridges and buildings

300 tph of aggregate goes up on the Acme-Hamilton conveyor belt to the concrete mixing plant... and from there to the hundreds of construction jobs served by the Parkway Concrete Co., Trenton, N. J. "This Barber-Greene Conveyor and Acme-Hamilton belt have given me better service than any other I have used," says Frank Talarowski, Parkway's general manager.

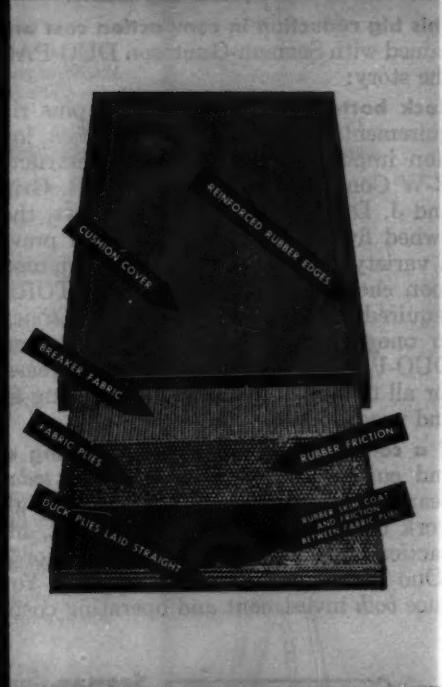
BETTER SERVICE at lower cost is assured when you make sure your belting is Acme-Hamilton. Whatever your conveying problem, A-H can solve it with a proven belt from its complete line, that will do a "Custom built" job for you. For a complete explanation of A-H belt construction and types, write for our "check-your-belt" Catalog.

Acme  **Hamilton**

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CERTIFIED
OWNER
REPORT

After comparing rental rates, I find

"I'm saving \$290⁰⁰ per month by owning a CASE 420"

— says Builder, Al Jensen, Kenosha, Wis.



"Our '420' hasn't been idle since we got it," says Jensen. "Whenever it isn't busy on our own jobs, it's a simple matter to rent it out." Here Jensen's "420" is being used to dig a sewer lateral. Powerful Case backhoe digs 12½' deep, cycles fast with exclusive 180° hydraulic foot swing-controls.

"Like a lot of other builders, I used to pour plenty of profits down the drain . . . just handling materials, digging holes and moving dirt by hand," comments Jensen. "I tried to stop the profit-leak by sub-contracting my digging, but ran into so many delays, I figured it would be cheaper to either rent or buy my own equipment.

Checked them all — bought Case

"After looking them all over, I decided the Case 420 Backhoe-Loader offered the greatest versatility, per dollar of cost, for my type of work. The torque-converter drive and rugged construction particularly impressed me. So I bought the '420' . . . at a saving of \$290.00 per month over rental rates . . . and believe me, it's the wisest investment I ever made."

Couldn't have gotten along without it

Just after starting on a new Piggly Wiggly Supermarket, Jensen ran into two months of wet weather. The site was so muddy, trucks couldn't get near it, but the torque-converter-equipped "420", with up to 6 tons push-pull power, walked right through — kept materials and job moving on schedule.

Saved 3 mason helpers per day for 5 weeks on block handling

By using interchangeable pallet forks in place of loader bucket, Jensen unloaded, transported, and lifted 34,000 blocks to masons on scaffolds . . . at an estimated saving of \$66 per day over hand-carrying. This saving alone amounted to one-fourth the total cost of the "420".

Clip...Mail for full details

J. I. CASE CO., Dept. H1499, Racine, Wisconsin

- Send free literature on Case 420 Backhoe-Loader with torque-converter drive
 Have nearest dealer call to arrange demonstration

Name

Title

Company

Address

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Zone, State

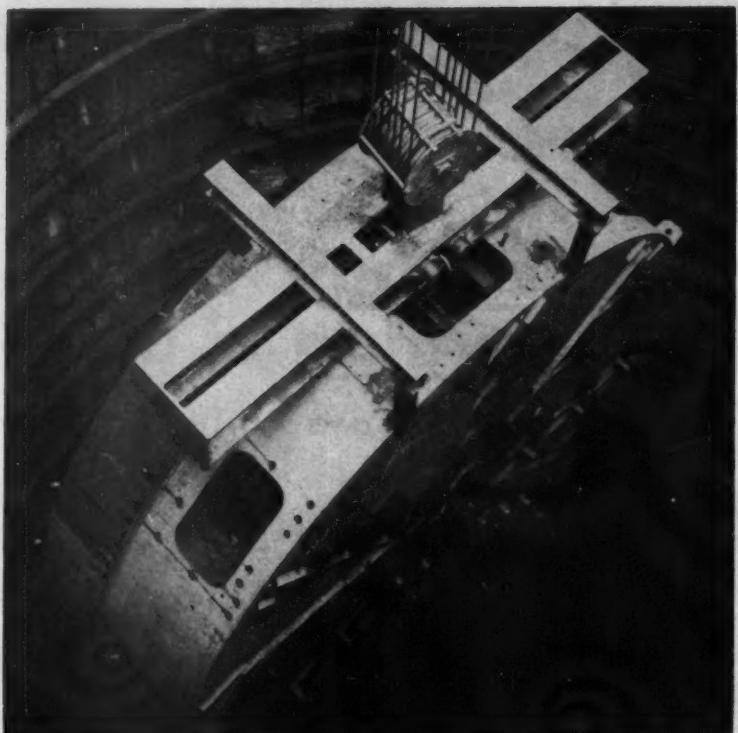
CASE®

J. I. CASE CO., RACINE, WIS.

C-BL-327

Steel Mole Chews Through Shale To Mine Tunnels at Oahe Dam

Faulted areas slow the new, single cutter-head mole considerably. But where shale is solid the mechanical boring machine tunnels up to 96 ft in 24 hours. It's double jointed and equipped with a hinge that allows it to work on a 500-ft-radius curve. And it can be broken down and reassembled in a week so it can be moved to mine seven tunnels.



DOWN THE SHAFT—Cutter-head first is lowered down shaft to a 24-ft-long starting section of hand-mined tunnel. Then the rig's machinery, frame, and conveyor are lowered.

THE MOLE continues to mutate!

Not the little tunnel digger of the animal kingdom; that beast, biologically, remains unchanged. The mutating mole is the amazing mechanical tunnel boring machine that is working its way through soft shale at Oahe Dam on the Missouri River near Pierre, S.D.

Newest of the species works for a Morrison-Knudsen-sponsored joint venture drilling \$13.4-million of intake and upstream power tunnels. It's vastly improved over the prototype model brought to Oahe three years ago by joint venture contractors Oahe Constructors (CM&E, Mar. 1956, p.78).

The seven tunnels the new mole

is boring are unusual. Oahe is founded on Pierre shale, a formation of crazy-quilt fault planes that tend to rebound, slide, and fall out. Tunnels are designed to avoid the worst of the faulted areas. They take off from shafts sunk deep into the ground, move horizontally from the shaft bottoms, then wiggle around to avoid faults before rising to the surface to hook up with turbines.

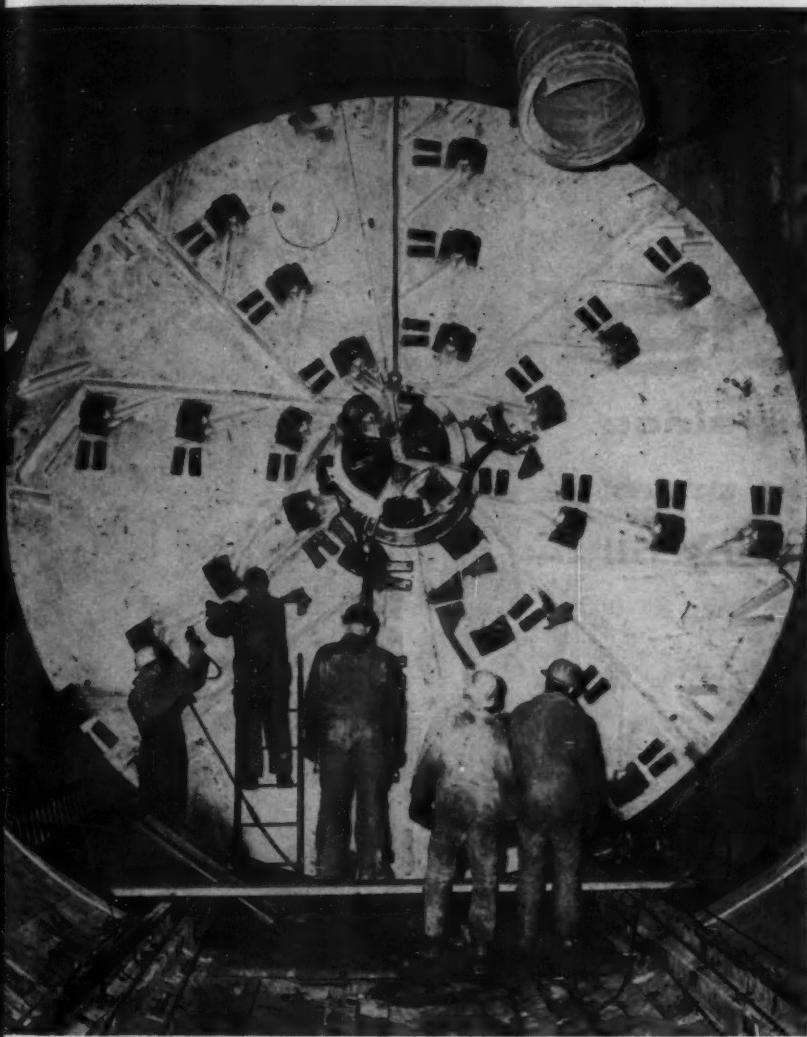
The new mole has a 29½-ft bore that creates a workable tunnel face 38.5% greater in area than the first mole. And the new rig embodies many improvements developed from field experience with the first.

Instead of two counter-rotating heads, the new machine has a sin-

gle cutter head. It is simple in design, construction, and operation. Its torque effect is counteracted by the placing of drive motors to the left side of the clockwise rotating head, careful distribution of weight on the machine's jumbo, and the torque bar action of the machine's frame.

Power is supplied by eight 300-v, 120-cycle, induction type, high-starting-torque electric motors rated at about 86 hp each. This type of motor obtains maximum power at speeds that rotate the cutter head at 4 rpm.

The earlier model's power supply was more complex. Two 200-hp wound-rotor motors powered the cutter heads through gear mechanisms. Two 750-kw GM



INTO POSITION—Workmen position cutter-head in starting section of tunnel. They next fit to it the drive machinery, frame, and conveyor. Then the mole goes to work.

diesel generators supplied 2,300-v stepped down by three 167-kva transformers mounted on the machine. Motor controllers provided short-circuit protection and permitted centralized push-button control at the operator's station. A dead front panel with circuit breakers and ground relay protected the electrical system. These motors rotated the cutter heads at rates of 9.2 rpm for the inner head and 6.3 for the outer head.

The new unit permits placing ring beams within 6 ft of the tunnel face instead of 12 ft, the limit of the earlier mole. This feature was designed into the unit to reduce fallout from the tunnel crown.

Mined shale is carried by belt

conveyor to the access shaft where it is transferred to a hopper and, from there, to a vertical skip hoist. This hoist is counterbalanced with two 5½-yd buckets that carry muck to the surface to be dumped into a surge hopper. From there muck is hauled away by 17-yd dump trucks.

The mole has other features to make it adaptable to the peculiarities of the tunnels. For one thing, the machine is double-jointed; it's equipped with a hinge that allows it to work on a 50-ft radius curve. And the rig is only 48 ft long compared with the 70-ft length of the first machine. In addition it is easily dismantled.

The job is keyed to the operation—repeated 14 times—of get-

ting the 200-ton rig in and out of the 40-ft-dia shafts. The critical operation comes at the bottom of the shaft. The mole must be lowered down the shaft, turned, and placed in a horizontal working position.

The lower part of the shaft is shaped much like a plumber's reducing elbow. It is concreted in two stages to make it possible to get the mole past the finished turn.

First, the vertical part of the elbow is concreted. It is 44 ft high with walls as thick as 9 ft and a clear finished diameter of 33 ft. The elbow concreting is done after the tunnel is driven, lined, and concreted.

Other major preliminary work is the hand mining of a 24-ft-long section in each tunnel. This portion, plus the clear space at the shaft bottom, acts as an assembly bay where the mole is put into working condition.

Before the mole is lowered down a shaft it is stripped of buckets, shield, ring beam jig, hoist, and conveyor. Then it is broken down into its principal components of cutter head and frame.

A 100-ton gantry lowers the parts into the shaft. First, the cutter head is lowered and moved into working position against the tunnel face. The frame next goes down the shaft and is turned into a horizontal position. Still hanging from the cable sling, it is con-

continued on page 108



WORKING—Mole deposits shale onto belt conveyor that carries the material to a vertical skip hoist at the tunnel shaft.

The days from 1950 until 1953 will soon be history with regard to heavy-duty low-bed trailers. And we know that you do want something new and different in your low-bed trailer.

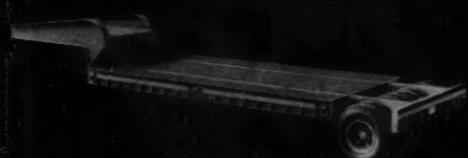
**It's been a
Long
long time-since
we had an order
we couldn't fill**

Trallimobile's complete line of low-bed trailers is designed to meet almost all heavy-duty construction requirements. And a wide variety of design options gives this great flexibility. Yet, we know that some requirements are too specialized for our basic models. So we are always prepared to build any low-bed to order. For more details, see your Trallimobile representative.



Model FS / 10 and 15 tons

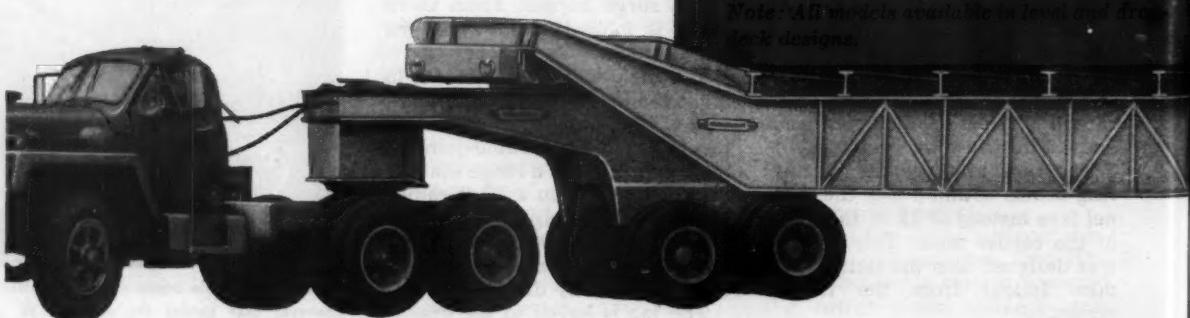
Model FS has a 16-foot platform between gooseneck and wheels. Applications for residential contractors ... for relatively-light construction equipment, hauling long or high items involving great pitch without too much weight.

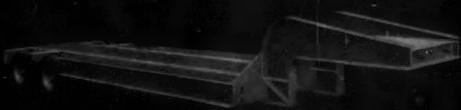


Model E / 15, 20, 25 and 30 tons

Heavy-duty, short-over-all-length low-bed with maximum length deck. Meets the requirements for operation in states that permit 15 to 30-ton loads on a single, eight-tires-in-line axle. The 30-ton model is extra-wide (9'3"), requiring special permits.

Note: All models available in level and drop-deck designs.





Model ZP / 15, 20, 25, 30 and 35 tons

Meets the needs of a majority of heavy-duty hauling requirements. Available with a wide range of specifications, the ZP provides the carrier with a tandem axle trailer for top capacity loads without special orders or weight permits.



Model FZP / 20, 25, 30 and 35 tons

The FZP, with low, flat-top gooseneck, beam-tilt, and hydraulically loading ramp, is designed for easy loading and unloading where a high capacity tandem-axle trailer is required. Well suited for handling winch-loaded equipment and crawler-track vehicles.



Model FC / 45, 50, 60 and 75 tons

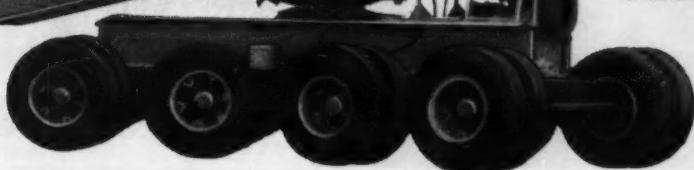
Heavy-duty, extra wide units. Require special permits for over-the-road operation. Applications: heavy electrical transformers, power generating equipment, specialized machinery, houses, steel building sections, and other specialized rigging and hauling.

TRAILMOBILE INC

Cincinnati 9, Ohio / Springfield, Mo. / Longview, Texas / Berkeley 10, Calif.

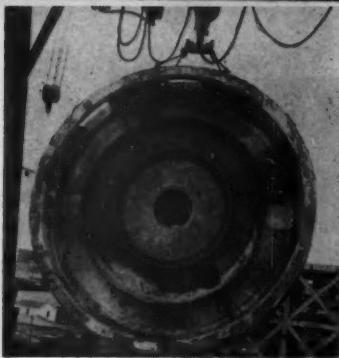


Special "T" Model,
150-ton capacity,
has hydraulic steerable
tandem for use on roads
with sharp curves.





UP FOR AIR—Between tunnels, mole returns to the surface for cleaning and overhaul.



THEN BACK DOWN—And again it is broken up and lowered down shaft.

MOLE CHEWS THROUGH SHALE... *continued from page 105*

nected to the cutter head. Subassemblies next are lowered and fitted in place. Then the rig is ready to work.

Where the shale is solid, the machine races forward like a thoroughbred. But in faulted areas it inches ahead like a spavined nag headed for the glue factory. Maximum advance in solid shale is 96 ft every 24 hr. In faulted areas, progress sometimes slows to almost zero. When fallouts occur, workmen must crawl through manholes in the cutter

head to hand muck in cramped space until the machine can be inched forward enough to get ring beams, ties, and blocking in place.

The mole bogged down for almost a month on the first tunnel when it ran into a fault line that followed the last 100 ft of the tunnel line.

M-K fought the problem for weeks. The machine would be cleared, inched forward a short distance, then again held up by fallen shale blocks that jammed

the buckets. Progress in nearly four weeks amounted to only 50 ft.

Pulled to the surface the mole was modified slightly. Its gear ratio was increased from 68:1 to 88:1 to increase power by about 25%. Openings in the shield were enlarged—to ease hand mucking when necessary; the ring beam jig was improved to speed placing of ring beams; and spaces between all buckets were reduced to decrease overload. Put back to work in the second tunnel, the rig drilled 88 ft during the first two days it was in operation.

Partners in the joint venture included Peter Kiewit Sons' Co. of Omaha, Neb., Al Johnson Construction Co. of Minneapolis, Condon-Cunningham Co. of Omaha, and F&S Co. of Butte, Mont.

Project manager is John Armittage; John Erdle is project engineer; and H. F. Pierce is mining superintendent. The work is under the supervision of the Omaha District, Army Engineers, Col. David G. Hammond, district engineer. Al Arrington is resident engineer.

continued on page 113



STANG LOWERS THE WATER TABLE

20 FT. IN -15° WEATHER

Sub-zero weather, yet business as usual—thanks to the reliability of a Stang Wellpoint System. In any weather, under all conditions, you can depend on Stang engineered dewatering systems. Call on the John W. Stang Corporation next time you have a dewatering problem. They're first in engineering, first in equipment, and first in service.

PROJECT: STORM DRAINS FOR MINNESOTA STATE HIGHWAY DEPT., BLOOMINGTON, MINNESOTA. CONTRACTOR: BARBAROSSA & SONS, INC., ST. CLOUD, MINN.

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FIELD REPORTS PROVE SUPERIOR PERFORMANCE OF NEW BOSTON BELTS

DIGEST OF PERFORMANCE FIGURES FOR 1296 BELTS*

44% increase in consistency of tensile strength

6% increase in tensile strength

130% improvement in consistency of elongation

* Compared to belts previously manufactured.

HERE'S WHAT DOES IT!

The startling figures above are a direct result of two major belt manufacturing advancements — both developed by, and exclusive with, Boston Woven Hose & Rubber Co.

ADVANCEMENT #1 **BALANCED BELT CONSTRUCTION** for the first time equalizes ply stress so that each ply pulls its full share of the load. BBC eliminates lazy plies. A BOSTON exclusive because only BOSTON can combine Electronic Tension Controls with Rotocure, the continuous method of vulcanization, which assures uniformity throughout the belt.

ADVANCEMENT #2 **DULON** markedly improves the aging characteristics of BOSTON belts. An exclusive BOSTON research development, the tough specially treated cover compound stays resilient longer . . . makes the belt much more resistant to abrasion, gouging, tearing and oxidation.

BALANCED BELT CONSTRUCTION plus **DULON** add up to
longer belt life . . . less trouble in service . . . greater economy.

BOSTON

BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN BILTRITE RUBBER CO., INC.
BOSTON 3, MASS.



INDUSTRIAL HOSE



BELTING



V-BELTS



PACKING



MATTING



TAPE



"I've seen our Ford Tandems pull out where others couldn't"

says *Walter E. Carlson, President
Park Construction Company, Minneapolis, Minnesota*

"We're still using the first Ford Tandems we bought in 1954!"

"In the construction business, our trucks really take a beating. They have to be rugged and durable, and that's why we like our Ford Tandems. On one of our earth moving jobs, for example, our Ford T-800's are in constant operation an average of ten hours each day, traveling about two hundred miles. They climb out of the pit, loaded with twelve yards of dirt, and walk right up a 12% grade. In fact, I've often seen our Fords pull out of places where other trucks couldn't.

"My father, who started the business back in 1910 with a horse and wagon, bought one of the first Ford Trucks ever made. That was over 44 years ago—and we've used Ford Trucks ever since. We pioneered the use of Ford Tandem Axle Trucks in this area in 1954. Now we have a total of forty trucks, including thirty-five Fords."

"We completely overhaul our trucks at the end of each construction season. That way we keep them in top operating condition and they last longer. We like Ford service, too, because we don't have to tie up our money in a large parts inventory. We can always get the parts we need quickly from our Ford Dealer."



FORD TRUCKS COST LESS

LESS - T

One day in five... GAS FREE!

Sun.	Mon.	Tues.	Wed.	Thurs.	FREE DAY	Sat.
1	2	3	4	5	C	



'59 FORD PICKUPS GIVE 25.2% MORE MPG!

25.2% advantage delivered in Economy Showdown Tests means five days' driving on four days' gas

The nation's leading automotive research organization* proved and certifies that a '59 Ford Six Pickup will run five days on the same amount of gas the average competitive '59 pickup burns in four days.

The tests were made on 1959 six-cylinder $\frac{1}{2}$ -ton pickups of the six leading makes purchased from dealers — just as you would. The trucks were tested in every kind of driving—high and low speeds, open highway and city streets, even simulated door-to-door delivery. And in every test '59 Ford Sixes delivered more miles per gallon than any other make.

Here are the actual percentages:

HOW NEW '59 SIXES RATE IN GAS MILEAGE

'59 FORD SIXES GIVE	25.2%	31.1%	9.6%	42.6%	22.0%	25.2%
more miles per gallon than Make "C"	more miles per gallon than Make "F"	more miles per gallon than Make "G"	more miles per gallon than Make "D"	more miles per gallon than Make "S"	more miles per gallon than the average of all makes	

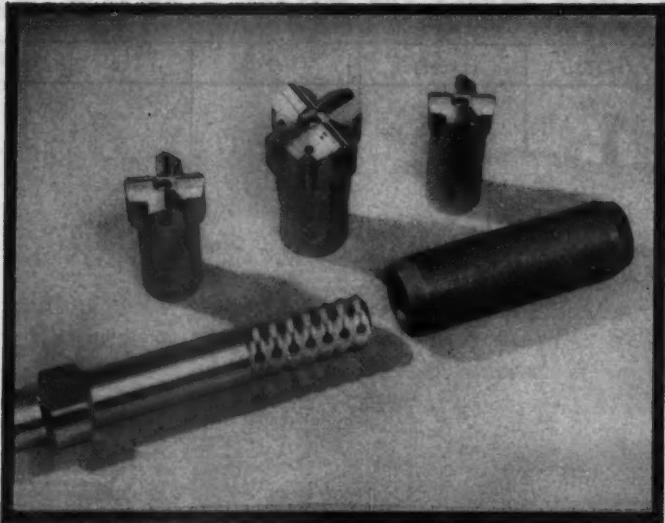
What's the secret of Ford's economy? First, of all pickup sixes, only the Ford Six has modern Short Stroke design which reduces engine friction and thus requires less fuel. Second, to this modern engine, Ford has added a new economy carburetor to meter fuel more precisely in both high- and low-speed ranges.

Your Ford Dealer has the complete report of Economy Showdown U.S.A. See him and get the whole story firsthand.

Go FORDWARD for savings!

*Name available on request.
Send inquiry to P.O. Box 2687, Detroit 31, Michigan.

LESS TO OWN... LESS TO RUN...
LAST LONGER, TOO!



Here's proof Coromant rope-thread bits and steels SAVE TIME AND MONEY

"Up to double the footage between sharpenings!"
"Premature rod breakage is almost non-existent!"
"40% more usable life—more resharpenings!"
"Bit and rod life are well above average!"
"Uncouple by hand all the time!"
*"More rigid—drills straighter holes!"**

*Names of men quoted available on request

The comments above are actual quotes from project managers, job superintendents, and drill superintendents who have tested new Coromant rope-thread bits and steels. They've learned, on-the-job, the benefits they—and you—can expect!

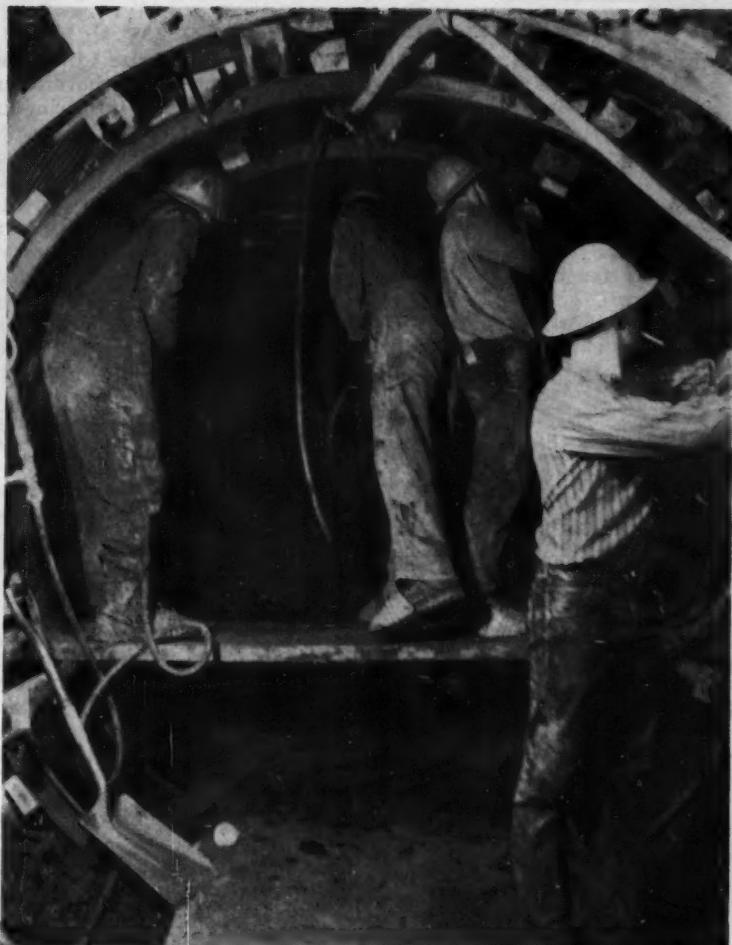
For example: The new rope-thread (only two turns per inch) holds tight in use, yet permits hand uncoupling. Reports show that the time saved results in more footage drilled per shift. Bit footage is well above average too, with less loss of carbide inserts. Prime quality ore plus nickel-chrome alloy permits cold-rolling from billets for greater strength, life and rigidity. And only with Coromant rope-thread steels can you re-thread without heat treating, too. Do it yourself, or at any nearby machine shop.

Want to know more? There's no obligation on your part, but we'll be glad to help where we can. Just call your nearest Atlas Copco Office, or write to us at Dept. CM-7.

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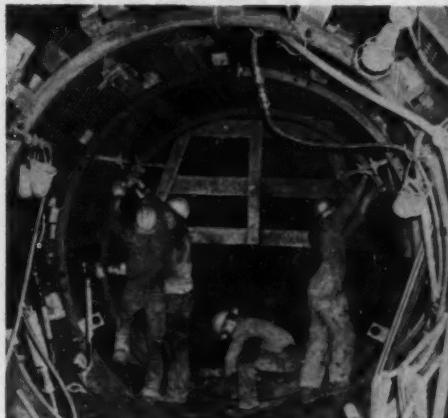
930 Brittan Avenue
San Carlos, California
LYtell 1-0375



BREAKING—Workmen handling pavement breakers with nail points pulverize a shale bench above tunnel's spring line. Shovel stiffs will follow up to muck out rock.

THE MOLE . . . continued

The job was too small for even a runt-sized mole. And blasting the tricky shale was out of the question. So these contractors turned to old fashioned hand mining to bore the job's drainage tunnels.



BRACING—Crews set ring beams every 4 ft of advance, 2 ft in bad ground.

Hand Mining Bores 64 ft Daily

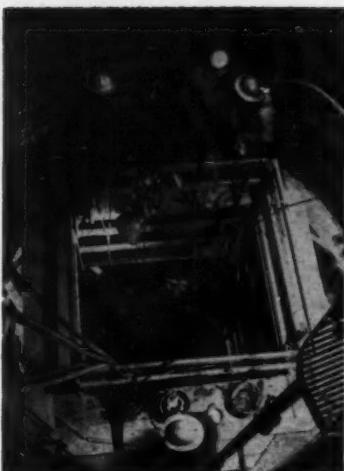
IN SHARP CONTRAST to the tunneling of the remarkable mole is the mucking of a drainage tunnel at Oahe Dam by hand labor.

It's a substantial undertaking. The 2,550 ft of tunnel has 9 and 11-ft rough dia and requires the removal of 6,800 yd of shale. And all of it is being removed by hand mucking.

The main bore, which parallels the course of the seven power tunnels, is 1,352 ft long. It is excavated on a 500-ft radius, the same as the power tunnels. The upstream end, forming a T, is a transverse tunnel. The upstream leg is 700 ft long, which means that it spans the entire area of the power tunnels. The lower leg or gallery tunnel is 466 ft long.

The upper end of the main tunnel is 54 ft higher in elevation than the lower tunnel. Thus, the downstream gallery tunnel is lower in elevation than the power tunnels. At the intersection of the main tunnel and the downstream leg is a drainage shaft, 14 ft in dia, that reaches down 92 ft. The drainage tunnel will be drilled with 3-in. holes on 25-ft center to form a sort of massive wellpoint.

Prairie Constructors decided blasting the tricky shale was out of the question. And the job was too small to justify building a runt-sized version of the mole. Even though the tunneling and related work is a \$2-million job, hand digging seemed the best approach. The way it's working out



SHAFT—Sinking temporary shaft early in job got tunneling started ahead of schedule.

THE MOLE . . . continued

confirms that judgment; four crews at four different faces are making an average advance of 64 ft a day.

Limitations of a tight job were eased early with the sinking of a temporary shaft. This permitted work to go ahead on tunneling while a permanent access shaft was being sunk and concreted.

Some mechanical aids at the headings increase the output of hand labor. These aids include

an ordinary chain saw (carbide teeth on it have an additional set that enables it to cut an extra-wide kerf), lightweight 30-lb pavement breakers with moil points, and a small belt conveyor.

A crew of five men work the face. Two men handling the chain saw make vertical cuts in the face as far back as the 30-in. blade will go. Three men with pavement breakers and two with shovels then work the face. The

breakers pulverize the shale while the men with shovels muck out a bench above the spring line.

The men with the breakers then mount the bench and work downward, breaking up the shale to invert level. Meanwhile, two shovel men load muck into the skip with a tiny belt conveyor.

When work has been advanced 4 ft, a ring beam is set. In bad ground, beams—3-in. I beams each weighing 5.7 lb per ft—are set every 2 ft. Seven mine ties secure each beam. Butted against the face at all times are 4-in. car channels that serve as crown bars.

Wire mesh is placed behind beams as work progresses. Within 48 hr after exposure, a modified 160 Pumpcrete machine lines the tunnel with 2 in. of concrete through a 6-in. pipe.

E. G. Libert is project manager for the joint venture that includes Winston Bros. Company, Minneapolis; Johnson, Drake & Piper, Minneapolis; Green Construction Co., Des Moines; American Pipe and Construction Co., Los Angeles; and Foley Bros., St. Paul, Minn.

Jack Feller is assistant project manager, Al Costner is general superintendent, and Walter Heisland is project engineer.

Useful Information

These *Construction Methods* reprints contain valuable information for contractors. Send your requests to: Editor, 330 West 42nd Street New York 36, N. Y.

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An art and a science

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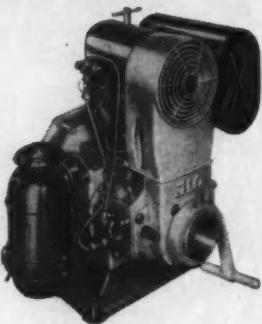
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Jlo Series 365
7 Horsepower



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(Pronounced "ee-lo")

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Haulpak... First All-New Truck in a Quarter-Century!

From L. Tourneau-Westinghouse — **NEW TOOLS TO
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Bigger-Powered Tournapulls
... 360-hp Turbo-charged "B" ...
270-hp V-Power "C"!

These are new milestones in LW's Parade of Progress... where earthmoving know-how, engineering skill, and long production experience combine to give you highest-output equipment at lowest cost.

New LW Motor Graders
... with Full-Sweep Visibility!



PARADE OF PROGRESS

For top production on long-haul jobs

NEW 6-WHEEL SPEEDPULL

276 hp . . . 20 yd heaped . . . 37.7 mph

Now . . . a profit-partner to 4-wheel Tourne-pulls . . . a six-wheel self-propelled scraper for long-haul assignments. New LeTourneau-Westinghouse C Speedpull moves more dirt *further* in less time . . . for less money . . . and more profit than any other six-wheel tractor-scaper in its class. Here are some reasons why:

- **HYDRAIR*** SUSPENSION: Rides on air! . . . piston-cylinder mounting of front wheels provides high ground clearance, avoids axle "dozing," permits fast, short turns.
- **BEST POWER-WEIGHT RATIO:** Only 336 lb loaded weight per hp! Step-gear transmission, 10 forward speeds, 2 reverse.
- **FEATHER-TOUCH POWER STEER:** Precision control with minimum effort. Completely shockproofed linkage. 41'2" Speedpull can turn 180° in space only 34' wide.
- **SPOT-TURN BRAKES:** For "skid" steering

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*Trademark

Note easy-loading features on Model 27 Haulpak as it gets heaping load of overburden in this quarry.



Check these HAULPAK advantages:

- Hauls up to 30% more than its own weight.
- Has no springs, because Haulpak rides on Hydrair (exclusive LW air-hydraulic suspension system).
- U-turns non-stop in far less space than ordinary trucks.
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Maximum tonnage at lowest-net-cost-per-load

Haulpak off-road truck

Three sizes: 22, 27 and 32-ton capacity

Now... LW Haulpak, first all-new off-road truck in a quarter-century... developed, after more than 3 years of research and field test, to give you highest output at lowest ownership-operating costs.

Although brand new, Haulpak is a fully tried and tested machine... working under toughest conditions through all seasons — in mines, quarries,

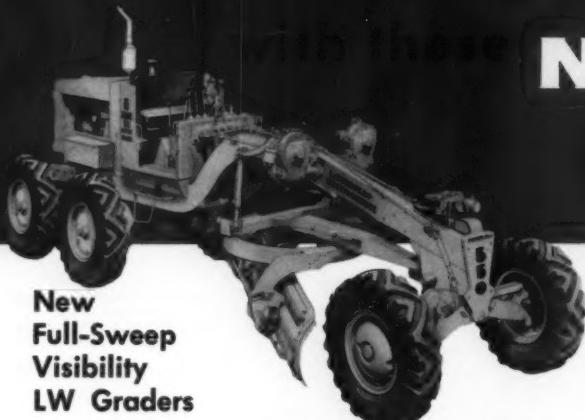
and on construction jobs. Its various parts and assemblies — some of them proved by *millions of hours* on LW Tournapulls all over the world — are much stronger than those on ordinary haulers. With the new LW Haulpak you can be confident your truck maintenance, repair, and operating costs will drop to a new low... and your hauling tonnage will climb to new highs!



**Biggest Haulpak of all
the LW-80
with 100-yd capacity!**

Designed for use as an 80-ton coal-hauler, this big 450-hp bottom-dump unit can hit 40 mph!

NEW MODELS



New Full-Sweep Visibility LW Graders

Your operator can see the road ahead as well as both ends of the blade! New, big 63" circle for positive blade control! Quick blade-tilt adjustment! New 6-cylinder engines available for 3 models! And more strength has been built-in where strength is important! Still standard are: Continuous-welded one-piece frame, with distinctive arch for higher blade clearance. Full-floating rear axle. Choice of GM or Cummins engines (mounted on rubber). 100% friction-free drive train. Easiest-operating controls. Two torque-converter, four "straight-stick" models, with 8 forward speeds, 4 reverse, 3 creepers!

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9-yd D Tournapull, handiest scraper made! 218-hp rubber-tired Tournatractor®, that travels anywhere, at speeds to 17 mph. Twin-C* Pusher, combining 436 hp, 40 tons weight, and 20-mph speed. Rear-Dumps: 11, 22, 35-ton capacities. Also Sheep's Foot Rollers... Drawn Scrapers... Bottom and Side-Dumps... and Tournarope®.

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New power... to speed acceleration, cut haul times, lick tougher grades, get bigger loads faster. B 'Pull* now offers turbocharged 360-hp GM engine, New "C" gives you V-Power, with 270-hp GM 8V-71 engine. V-Power C 'Pull has the BEST power-to-weight ratio in the medium-sized scraper field! Standard on both machines: easy-loading Fullpak scrapers... a big 28-yd model on the "B", a new 20-yd unit for the "C"! 335-hp "B", 226-hp "C", and 143-hp "D" also available.



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Your nearby LW Distributor is ready, willing, and completely able to help you in many ways. In addition to LeTourneau-Westinghouse equipment, he handles other lines of quality earthmoving tools. He is in a position to give you honest appraisal of trade-in-equipment, and will assist you in obtaining helpful financing when it is needed.

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And even if you're NOT in the market for equipment or service, make your LW man work for you! Remember, every LW Distributor is a man of long experience

in earthmoving. Call on that experience... whether in planning a job, figuring a bid, or any problem where more "know-how" will help!



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PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company
Where quality is a habit

news and notes from the field

CRACKS IN CONCRETE: why they occur—how to control them

Cracking is one of the most misunderstood problems in concreting, and is generally regarded as a sign of defective concrete. On the contrary, most cracking is the result of improper construction practices and can be controlled by simple precautions.

Like other construction materials, concrete contracts and expands under various conditions of moisture and/or temperature. This normal movement should be anticipated and provision made for it in the design, placement and curing of concrete, otherwise cracks may result.

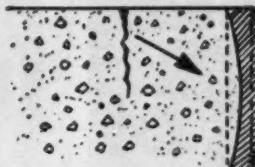
Generally, most cracking is caused by stresses exerted in or on new concrete while it is still "green"—before it has gained sufficient strength to resist such forces. A majority of cracks occur during the first few days after concrete is placed. As a rule, most cracks result from:

- Shifting of concrete before it hardens
- Shrinkage and expansion of concrete before and after hardening.

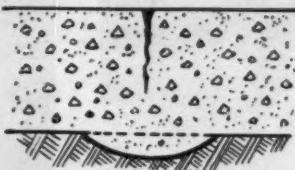
Shifting Before Hardening

This condition can cause cracks that are extremely difficult to diagnose. See Figures A, B and C. These cracks are caused by forces resulting from improper construction practices such as:

- Unstable forms
- Unstable subgrade (uncompacted, frozen, muddy)
- Sub-base paper rupturing on uneven sub-grade
- Jarring of unstable ground
- Improper placement of reinforcement (too close to surface).



A Bulging or shifting of forms due to timber expansion, loosening of nails or clamps, weak form construction, etc., can cause cracks having no particular pattern. Concrete surface distortion is usually the sign of form shifting.



B Subgrade paper rupture or poor sub-grade allowing concrete to shift while setting can cause cracking as shown above.



C When concrete settles over obstructions such as reinforcing steel, cracks may occur. This cracking can be prevented by using low-slump concrete and stable sub-grade or good footings on good solid ground.

Shrinkage and Expansion

While concrete is plastic or fresh, it occupies its largest volume. When dry, cold and completely carbonated, it has its smallest volume. Varying conditions of moisture, temperature and age between these extremes cause concrete to shrink and expand slightly. Unless provision is made for these normal volume changes, and good concreting rules are observed, cracks may result. Shrinkage during hardening and drying can be greatly reduced by using as little mix-

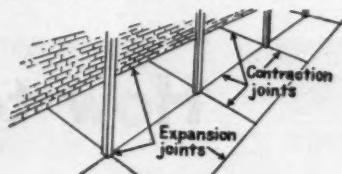
ing water as possible, dampening the subgrade and forms, and curing the concrete properly.

Shrinkage cracks can be prevented or effectively controlled by contraction and expansion joints, and use of low slump concrete.

Fill groove with mastic



D Contraction joints should be placed at points of stress concentration so that in case of shrinkage, cracking will occur neatly beneath the joint as shown in Fig. D. They can be neatly finished so final appearance of the structure is not marred. In sidewalks, place joints at 5' or 6' intervals. In driveways, place them at 15' to 20' intervals. In large floors, place joints at 15' to 20' intervals. In buildings divided into bays by columns, place joints where shown in Fig. E, but seldom over 20' apart unless adequate steel is used. Cracks in solid concrete walls are minimized by using low slump concrete. Narrow feathering of concrete sections should be avoided to prevent cracking.



E Expansion joints should be placed at junctions of walks with driveways, buildings, curbs, light standards; where a floor joins a column base, stairway, etc., or anywhere else that concrete freedom of movement may be restricted.

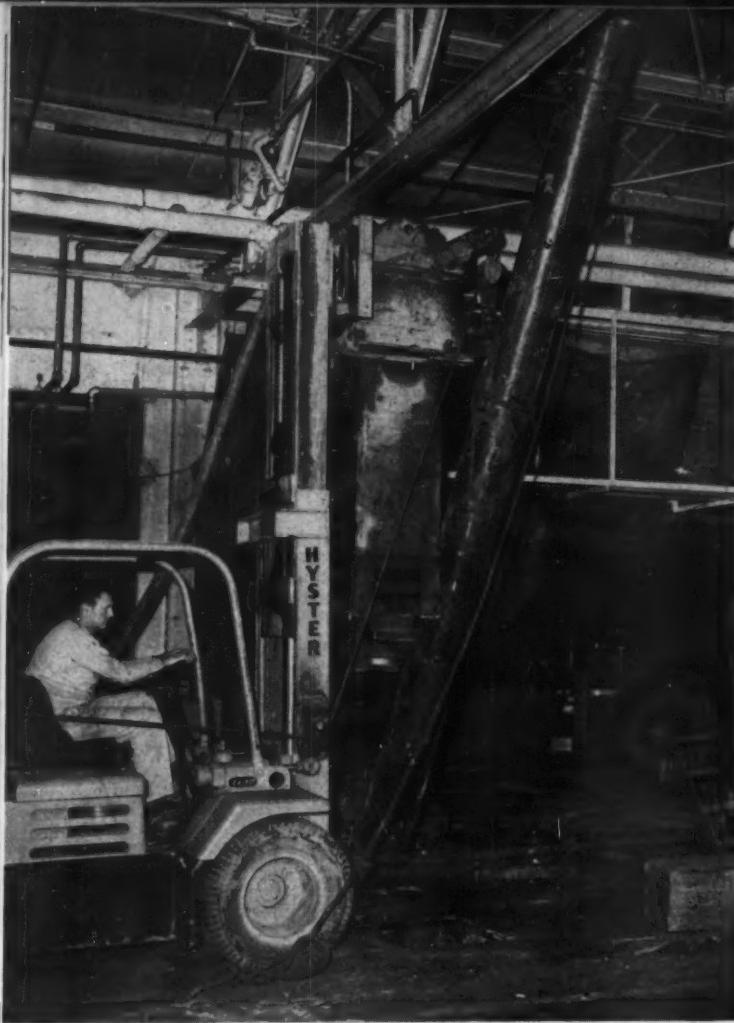
Joints cannot be expected to prevent or fully control situations such as:

- Dry subgrade
- Drying due to weather immediately after finishing
- Carbonation in initial stages of curing
- Lack of protection from low humidity atmosphere.

For more information on causes and control of cracking, ask your Alpha representative or write for the Craftsmanship in Concrete folder: "Cracks in Concrete".



ALPHA
PORTLAND CEMENT COMPANY
Alpha Building, Easton, Pa.



IT SETS THE PILE—Thomas hoist powered by a 6-hp gasoline engine handles rope line that rises, lowers, and positions pipe pile.



DRIVES THE PILE—McKiernan-Terry 9-B-2 double-acting hammer fitted to Hyster drives pile into basement

How to Drive Piles Where You Sh

Just fit a pile hammer and a winch to a fork-lift truck and you have a handy combination crane and pile driver that will work in the most confined areas.

By HOWARD R. GOULD
Vice President
Spencer, White & Prentis, Inc.

IT TAKES a lot of ingenuity to underpin a building when you can't interrupt whatever activity is going on inside.

That's what we learned when we took on the job of underpinning 35 columns and 600 lin ft of wall without interrupting normal business routine in the three-story assembly plant of Fisher Body Division, General Motors Corp., at Tarrytown, N. Y.

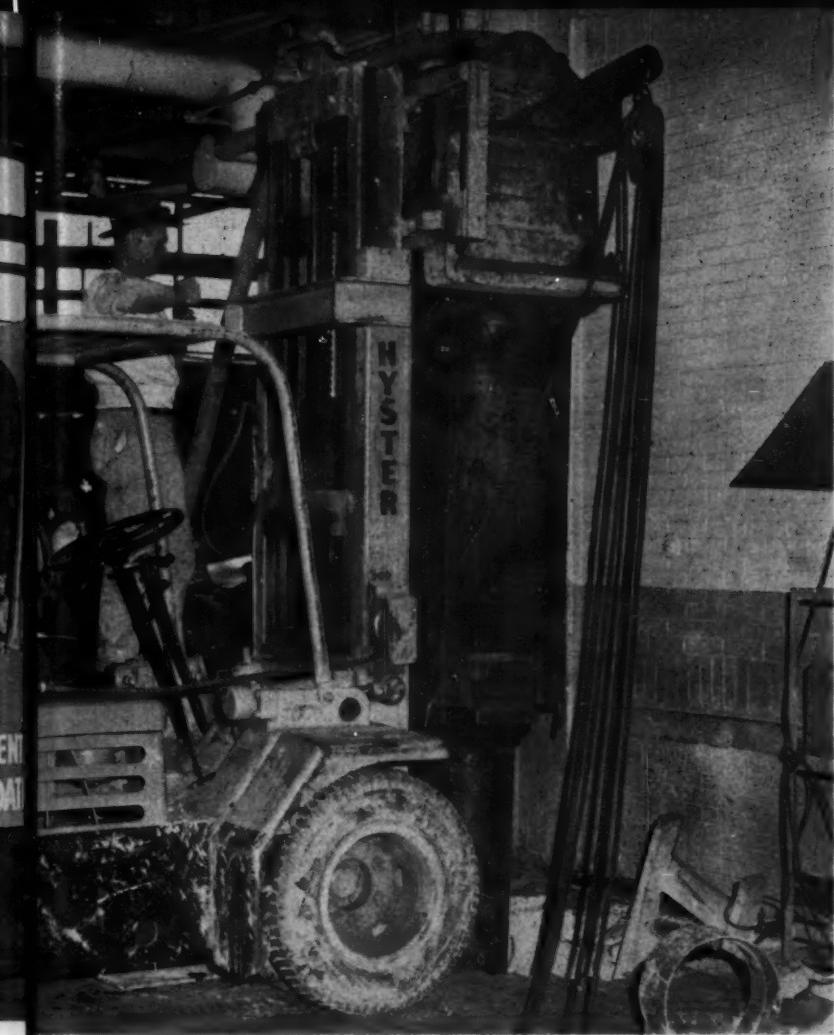
The structure, supported on 15-ton timber friction piles driven into fill and river silt, had settled as much as 12 in. over a period of 20 years. Greatest settlement had occurred along one side of the building. This made, between the outside line of the building and the first interior row of columns, a large differential settlement that damaged reinforced concrete floor slabs, beams, and lintels.

The underpinning design we developed with Argonaut Realty Division, General Motors Corp., called for carrying the columns

on steel grillages supported on end-bearing, 12-in.-dia, open-end pipe piles 40 to 70 ft long. These were to be driven to rock or refusal, cleaned out, and filled with concrete.

We decided it wouldn't be safe to cut conventional needle support pockets into the reinforced concrete columns without setting up extensive shoring that would interfere with plant operations. So we cast a reinforced concrete collar around each column to transfer loads to grillages.

Headroom in the basement var-



from first floor. The pile passes through a 2-ft hole cut in the first floor then through a second hole cut through the basement floor. Piles are driven to rock or refusal.

Shouldn't

ied from 5 ft 9 in. under beams to 7 ft in areas under the flat-slab first floor wherever it was unobstructed by steam, water, sewage lines, and electric ducts. On the first floor—the main operating floor—headroom varied from 12 to 14 ft.

Here, then, was our problem. How were we to install these piles inside a building with limited headroom through fill, boulders, and hardpan to rock?

We decided to drive the piles from the first floor through holes 2 ft sq cut in the floor. The holes were big enough to permit passage of a McKiernan-Terry 9-B-2 double-acting hammer.

To handle the hammer, piles, and pile-cleaning tools, we adapt-

ed a ZA-80 Hyster 8,000-lb-capacity fork-lift truck. With this truck we could lift the hammer until its top touched the ceiling, beam, or piping. That let us take advantage of every available inch of headroom.

We secured around the chest of the hammer a lifting collar made of steel plate and angles. The truck's forks raised and lowered the hammer from under this collar. When the hammer was not needed, it was a simple matter to lower it to the floor upright and back the forks of the truck from under the collar.

A Thomas hoist, powered by a 6-hp gasoline engine on the back of the Hyster, handled a rope line that ran through a sheave to a block at the end of a short boom welded to the hammer collar.

This line handled the pipe sections, air jet, Dwart orange-peel bucket, and other tools needed to clean out the inside of the piles. The air jet, operated by plant compressed air, did the major job of cleaning out the piles. This jet was handled from the first floor by the Hyster, and the material from inside the pile was ejected in the basement and controlled with a specially made hood to prevent damage to plant and equipment.

We excavated, through the



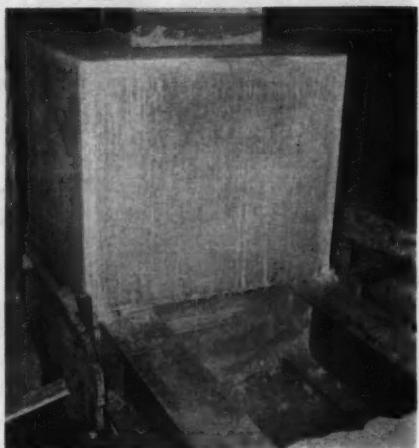
CONCRETES THE PILE—Smaller Hyster handling a Roura self-dumping bucket pours 2,500-psi concrete directly into an elephant trunk that carries the mix into the pile.

Concrete Collar transfers Column Load To Grillage

PREPARE COLUMN—Reinforcing steel is wrapped around scored column flanked by steel grillage that rests over four concreted piles.



POUR CONCRETE—Transit-mix truck chutes concrete into a Roura self-dumping bucket set on Hyster fork lift that will carry it to plant.



AND IT'S FINISHED—Pour completed, forms are stripped and wedges are driven between piles and grillage to transfer load.

basement floor, a 4-ft-deep sheeted starting pit around each column and threaded 14 to 16-ft-long pile sections through the 2-ft holes in the first floor. Pile bottoms came to rest in the starting pit. Piles then were driven in sections, spliced, re-driven, and cleaned. The hammer was operated by plant air at 100 to 110 psi.

After we cleaned out the piles, we made cut-offs at the proper elevations and filled the piles with 2,500-psi concrete. Transit-mix concrete was carried from trucks outside the plant to the site in a Roura self-dumping bucket by a Hyster XA-60. The bucket dumped directly into a first-floor hopper of an elephant trunk leading into the pile below.

We then installed a supporting grillage leaving a space between grillage and piles for plates and wedges. The concrete collar next was formed on top of the grillage and poured with high-early-strength 3,500-psi concrete. When the collar had attained the required strength we installed the wedges between the piles and grillage, pre-deflecting the steel beams and transferring the column load to the new piles.

We tested the first column underpinned. Instead of the plates and wedges, Watson-Stillman hydraulic jacks of 50-ton capacity, powered by a Simplex hydraulic pump, were installed between the piles and steel grillage. By actuating the jacks we were able to test the bond strength of the collar to the column.

When we completed tests we wedged short beams between the pile and collar to remove the load from the jacks. The sheeted pits in which this work was done were covered temporarily with steel plates as a safety measure. Six months later, we repeated the test and found no loss of bond.

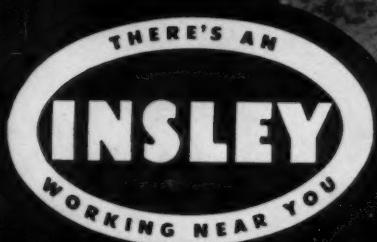
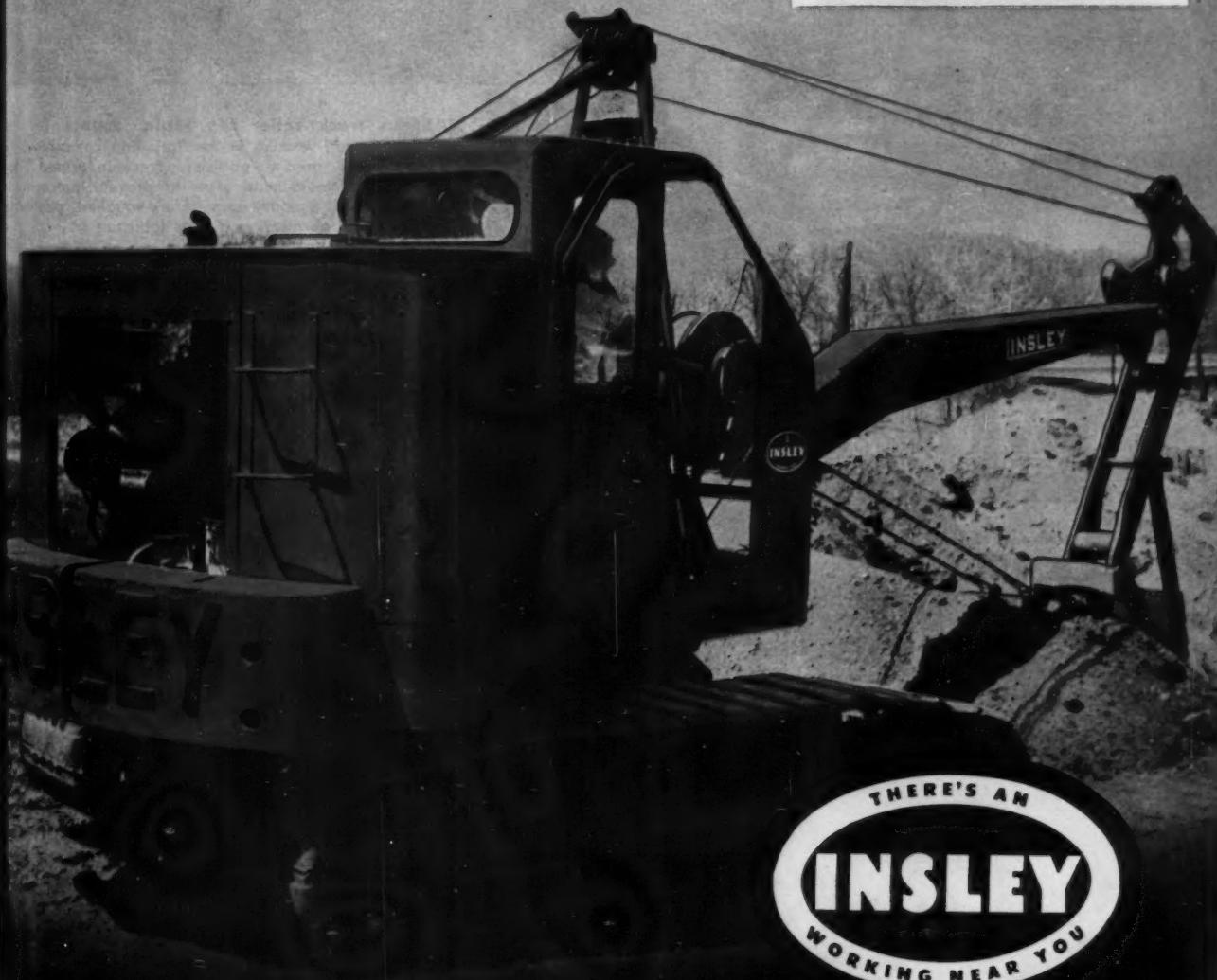
To complete the work we encased the steel grillages and the tops of the piles in concrete and restored the floor. The completed underpinning operation will consist of installing 200 piles for a total length of approximately 12,000 lin ft as support for 35 columns and 600 lin ft of wall.

General superintendent for Argonaut is Marvin Williams; William Ewoldt is job superintendent. Donald McKinley is general superintendent, and Mike Canale heads this construction job for Spencer, White & Prentis.

A NEW LOOK with better than ever performance

Now you can have an Insley Type K or Type L machine with a modern WIDE VISION cab . . . and at no extra cost. This better all-round visibility lets the operator do more and do it more safely.

If you haven't looked inside an Insley Type K or Type L lately, you've missed a lot of other design improvements, starting with a spring cushion seat for the operator. Make a date with your Insley distributor today. Let him give you the full facts. The Insley Line includes excavators and cranes from 5 to 45 tons in capacity.

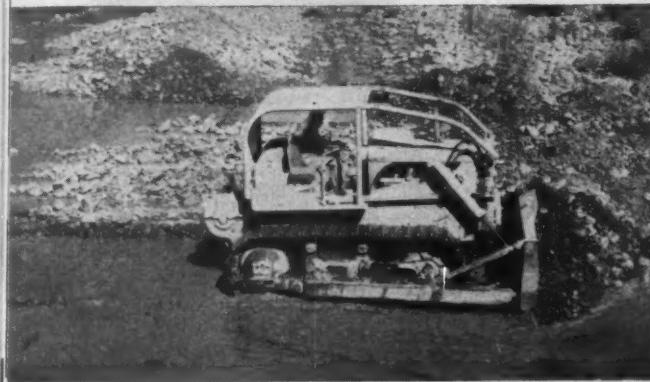


INSLEY MANUFACTURING CORPORATION

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Only proven International delivers bonus

Blade a bonus load—flip the Shuttle-Bar—and you reverse the TD-15 instantly and reposition fast! New TD-20 and TD-15 owners, the country over, are reporting "next-size-bigger" production from these proven models!



Bonus track roller life really counts for the TD-20 owner, working in the "grinding compound" of water-borne granite particles. Precision-lapped, floating, metal-to-metal seals in proven International track rollers provide never-before-equalled protection to keep out abrasives and keep lubricant in!

Years-Proven Planet Power Steering, unequalled undercarriage strength and ease of control make the TD-24 what many contractors call "the rock-dozer special" of all king-sized crawlers. "Live track" steering with both tracks pulling full time means bigger loads every push!



**International®
Construction
Equipment**

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

dependability tough-job performance!

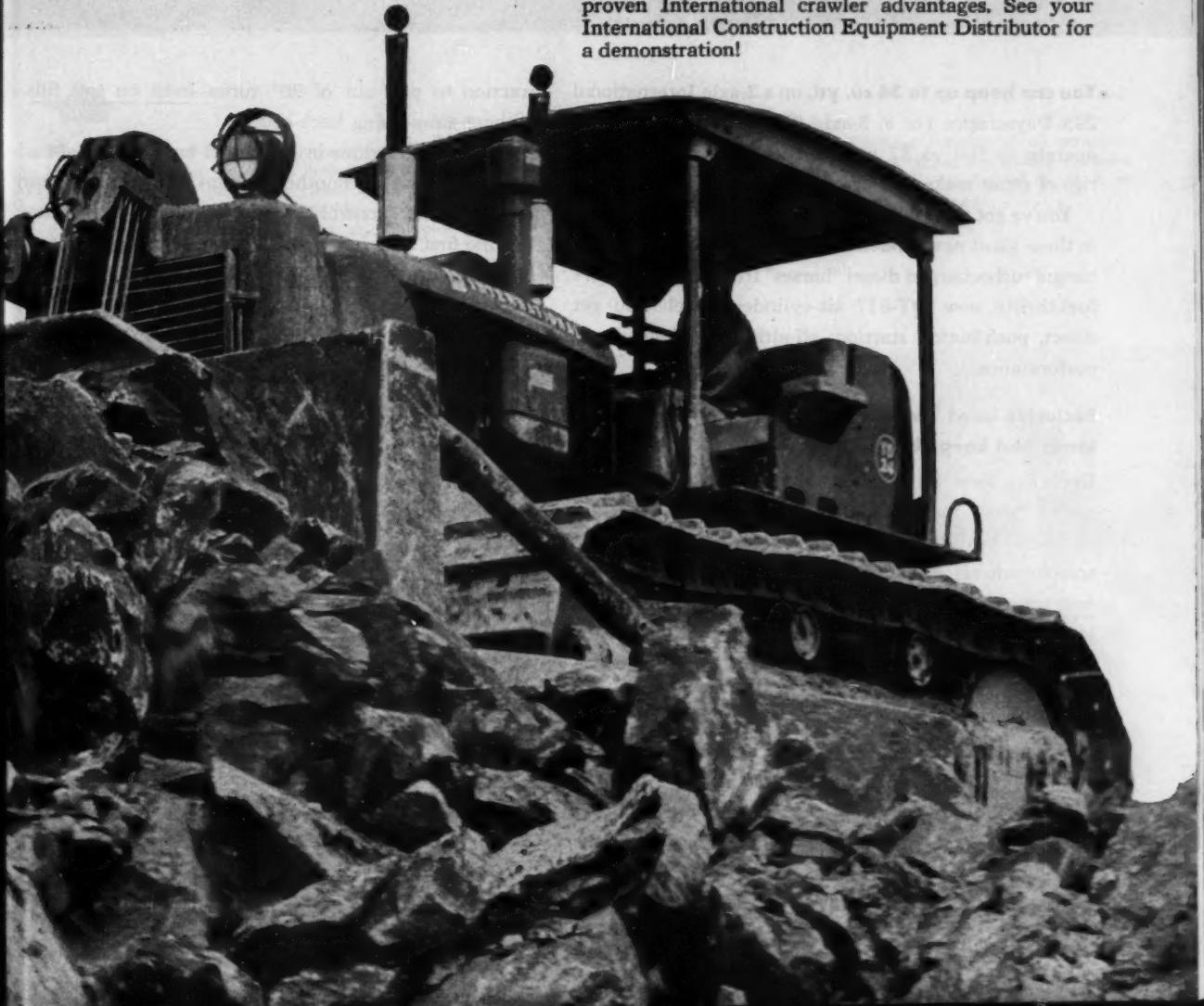
Only International provides heavy-duty-type track-rollers—the “originals,” since 1956, with cartridge-type, floating metal-to-metal seals. Only International gives you heavy-duty roller bushings and king-size lube reservoirs, plus husky, big-diameter track roller shafts. Exclusive pressure relief passages guarantee positive prevention of seal blow-out or damage from power lubricators! Measure the advantages of proven International roller design in longer wear life, and downtime prevention!

Only International gives you the proven power-transfer efficiency and design simplicity of sintered metal-faced, dry-type engine clutches. With simple, uncomplicated operation, this heat-defying clutch operates efficiently at all temperatures—reduces lever pull up to 50%—needs no cooling system—delivers proven low upkeep!

Only International gives you proven exclusive cycle-speeding, load-increasing features—that pile up bonus production on tough or easy jobs. Only the TD-24 gives you Planet Power “live” track steering advantages—eliminates “dead-track drag”—pulls or pushes the same big loads on turns or straightaways—gives Hi-Lo power-shifting of either track on-the-go! And both TD-20 and TD-15 give you 6-speed, full-reverse transmissions with “single-stick” shift, and fast Shuttle-Bar forward-reverse control!

Big International crawlers give you smooth, high-torque, proven 6-cylinder diesel performance! You get 6-cylinder smoothness without “balancer” complications! For seconds-fast starting, lightning “load-follow” governing, and fuel-metering accuracy, compare proven International diesels!

See what it means in tough-job performance—and all-job bonus production—to arm your operators with proven International crawler advantages. See your International Construction Equipment Distributor for a demonstration!



Measure new 34 cu yd
International Pay-
scraper advantages

NEW power-to-payload

hauling, jam-proof ejection



You can heap up to 34 cu. yd. on a 2-axle International 295 Payscraper (or a 3-axle "495" model). You can operate as fast as 32 mph.—faster, even than smaller rigs of other makes.

You've got industry-topping, power-to-payload wallop in these giant new models. You get the sock of 375 high-torque turbocharged diesel "horses" from International's fuel-thrifty new DT-817 six-cylinder diesel. You get direct, push-button starting; all-altitude high-efficiency performance.

Exclusive bowl "with a flare" loads and keeps bigger heaps!

Exclusive new Payscraper tapered bowl design out-cycles "slow loaders," "load spillers," and "reluctant dumpers." Widest of all cutting widths—131 inches—lets scraper wheels and pusher operate inside the cut, the best traction zone. Wide-cutting bowl and center rolling boil-in speeds heap loading. The tapered bowl is a superior heapholder even at the faster haul speeds. Obstruction-free bowl provides fast, positive jam-proof ejection.

Operators become full-time earthmovers!

Minute-stealing operating delays are eliminated, with speed-gaining, balanced design. The 295 Payscraper operator, for example, commands ample power and

traction to pull out of 90° turns—even on soft fills—without time-losing back-ups.

The operator rides in cushioned comfort in a 16-adjustment seat that smothers bumps. He has reach-easy power brakes, "control tower" vision, flush deck safety. For the first time in big 2-axle scraper history, the operator becomes a confident, full-time, full-capacity dirt-mover!

From power to push-block—from fuel thrift to dirt on the fill—compare new giant-sized International Payscraper models to anything else on wheels. Note how they lead in turbocharged diesel horsepower. Match exclusive tapered-bowl scraper advantages against less-advanced design. Size up strength—ease of control—speed—capacity! See your International Construction Equipment Distributor!



International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

wallop...NEW speed loading, NEW full-power 90° turning



Three "295's" of a 6-unit Payscraper fleet, building new superhighway near Beloit, Wisconsin. Both the "295" and "495" feature International's fast-acting, finger-tip controlled model 280 cable control unit—built to give you high capacity; simple adjustments; low upkeep! Positive, forced ejection, plus gaping 98"

apron opening, assures fast, positive dumping of all materials. Even gummy, barrel-sized blue clay chunks are quickly ejected—as this "495" view proves, on an operation of V. H & M Construction Co., Denham Springs, Louisiana.



Loading old pavement on U.S. 20 near Rockford, Illinois, with new TD-20 Four-in-One. Owner is Rockford Blacktop Co. One owner reports replacing 3 power shovels and a dragline with one 3-cu yd 4-in-1 on concrete pavement removal!



How big clam-action 4-in-1's can replace boom-type rigs ...on *slam-bang* pavement removal

You get 32,200 lbs of-max. torque push in the new TD-20 Four-In-One—to "crowd-home" the bucket in extra-tough material. This big rig also gives you 41,200 lbs of bucket-heaping, pry-over-shoe break-out force!

Both the 3-cu yd TD-20 and 2½-cu yd TD-15 Four-In-Ones have weight-saving, capacity-adding high strength Man-Ten steel in frame and lift arms—and super strong, abrasion-resistant T-1 steel in buckets.

Both these big rigs have International 6-cylinder diesel power wallop and smoothness. Both have 6-speed, full-reverse transmissions. Both have fast "single-stick" shift and Shuttle-Bar forward-reverse control to speed-up loading cycles!

And only International Drott rigs have shock-swallowing Hydro-Spring protection—that "gentles" machine-mauling impact forces by a whopping 67%!

Prove you can streamline tough pavement removal jobs with a big 4-in-1—for a fraction of what you'd pay for equivalent boom-type rig capacity. Move the selector lever—see what it means to command versatility unlimited of clamshell, dozer, "scraper" and Skid-Shovel under one-man control. See your International Drott Distributor for a 4-in-1 demonstration!

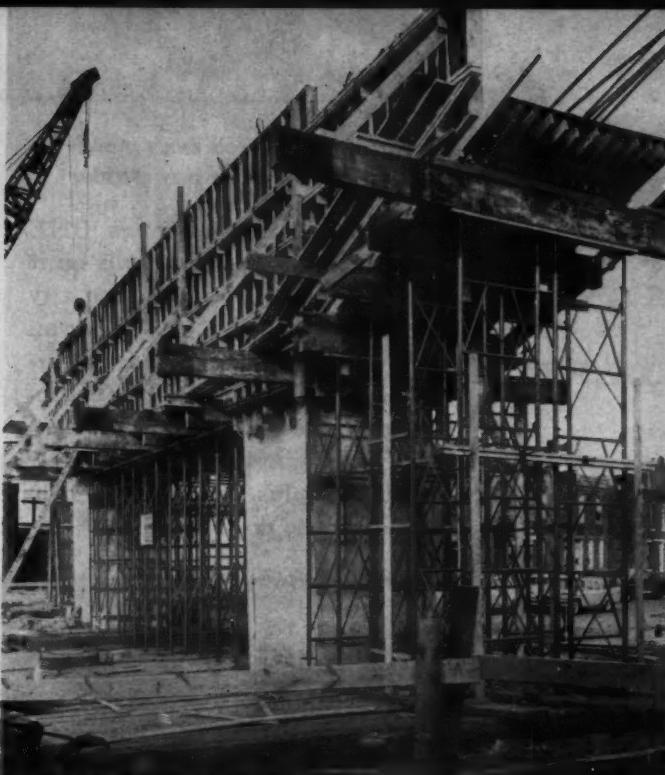


Exclusive clamshell bottom-dumping allows easing concrete chunks into truck—reduces impact on truck body. Four-in-One bottom-dumping also eliminates the sticky materials problem!



International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT •



HEAVY-DUTY SHORING—Tubular steel shoring frames with capacity of 10,000 lb per leg support pier cap forms that contain as much as 200 cu yd of concrete.

Big Frames Do Twice the Work

TUBULAR STEEL SHORES support forms for massive concrete pier caps as much as 25 ft above ground on an elevated highway job in Philadelphia.

These shoring frames are similar to thousands in common use. But there is one big difference; they have double the capacity of ordinary shoring—10,000 lb per leg as against 5,000 lb.

They have to be sturdy for the Philadelphia job. Most of the pier caps cantilever out 14 ft 3 in. and contain 170 to 175 cu yd of concrete. Some are bigger; two of them in a railroad yard where track clearance is a problem have cantilevers extending 19 ft 6 in. and contain 200 cu yd of concrete.

These shores require less erection time, storage space, and transportation than do ordinary shoring frames. Half as many frames do the job because of their heavy construction and big capacity. But they are easy to handle. The smallest frame is 3 ft 6 in. long and weighs 41 lb. The largest is 6 ft 6 in. and weighs 69 lb. They have vertical legs placed at 3 ft 6-in. centers.

A crew of five men can erect

or strip the shoring for one pier cap in one day. Safway Steel Scaffolds Co., of Philadelphia is the shoring subcontractor.

The general contractor, Buckley & Co., Inc., of Philadelphia, first constructs a heavy timber mud sill. Then a Safway crew erects the shoring.

The scaffolding crew first places screw jacks with base plates resting on the timber. The jacks fit into the bottom of each leg and are adjustable over 24 in. Frames are placed on 24-in. centers on the screw jacks. Nails driven through holes in the base plates anchor the scaffold to the timber base.

Handling the frames is no problem. Workers simply hand the frames up to crew members standing on the erected portion of the scaffolding. When the top of the erected scaffolding is out of reach, the crew uses a simple pulley arrangement for hoisting the frames.

At the desired elevation the crew places screw jacks in the tops of the legs and adjusts them to within 2 in. of the final grade. Workers set the final

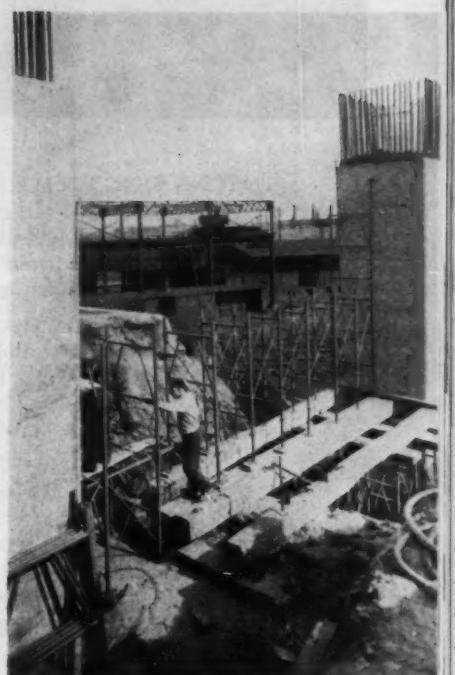
elevations at the time the concrete forms are placed.

The cantilevered portions of the caps are sloped. To adapt the shores to this condition adjustable shoring tubes are added as needed. These permit adjustments in 6-in. increments over a range of 3 ft 6 in.

The shoring is rigid. Center-pivoted cross braces join together any two frames of the same size for lateral support. Wing nuts or Quick-Lock studs attach the braces to the frames. The studs have gravity latches that lock the braces in place when the frames are right side up or upside down.

Because the cantilevers are sloped and the shoring frames are spaced closely, shoring ledgers are not used on this job. But hollow steel shoring ledgers that fit on top of the head plates to support beams or joists are available. Joist saddles placed on the ledgers hold 2-in. lumber joists.

The field superintendent for Safway is Robert Johnson. F. H. Lohr is general superintendent for Buckley & Co.



ADJUSTABLE LEGS—Screw jacks in top and bottom of each leg and adjustable shoring tubes adapt frames to any slope. Scaffolding in hole supports base of shores.

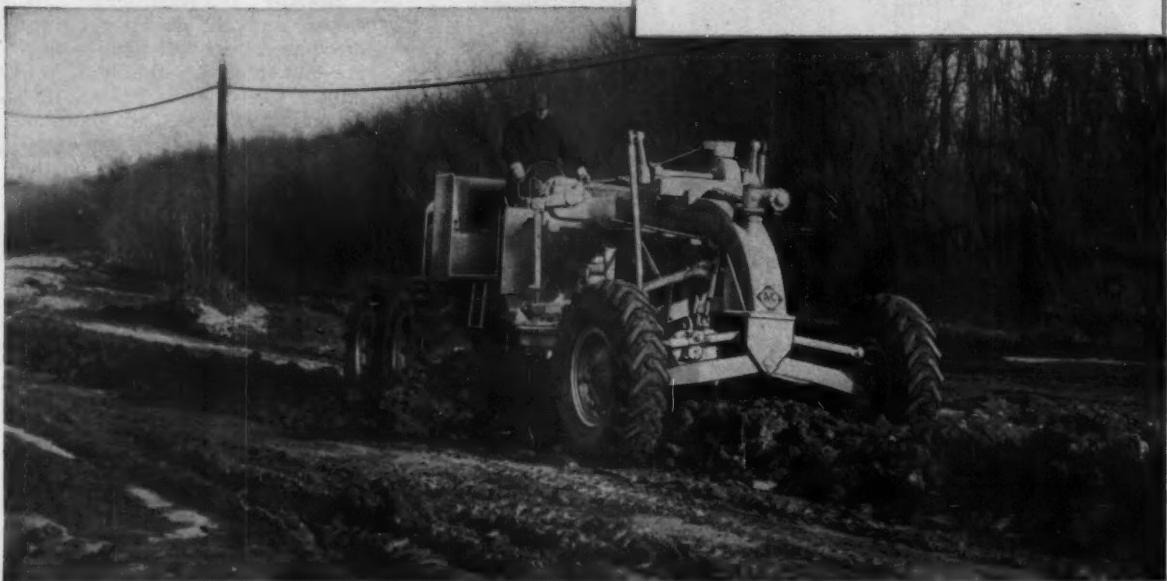
now at your Allis-Chalmers dealer

**the ONE FORTY FIVE—
OUTSTANDING VALUE IN
MEDIUM-POWER GRADERS**

80 hp 21,540 lb

**...with features you can't match
for the money on any grader**

The new Allis-Chalmers ONE FORTY FIVE motor grader is built to outwork and outproduce any grader near its size...at a price you can't afford to overlook. An exclusive combination does it: high capacity front axle and throat clearance, big-grader power train, ROLL-AWAY moldboard, plus benefits that help an operator to do more work.



The ONE FORTY FIVE power train is built for long grading service. Simple, dry-type ceramic-lined clutch; constant-mesh transmission; heavy-duty gear train — all much stronger than you usually find in a grader this size.

Big clearance under the front axle straddles huge windrows without drag. Watch the ROLL-AWAY moldboard lift and roll the load. Check the load-clearing height from cutting edge to circle. You'll get more grading production than any other medium-sized machine can give you.

Now check these operator advantages. Platform is clean and roomy. Suspended pedals provide matchless foot room. Full visibility all around takes the strain out of operating. Toggle-type control levers allow ample road feel without wrist-snapping backlash.

Your Allis-Chalmers dealer will show you an

eye-opening demonstration of the ONE FORTY FIVE. Then keep its low cost — and high performance — in mind when you're ready to buy. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ROLL-AWAY is an Allis-Chalmers trademark.



ONE FORTY FIVE
80 hp 21,540 lb approx.

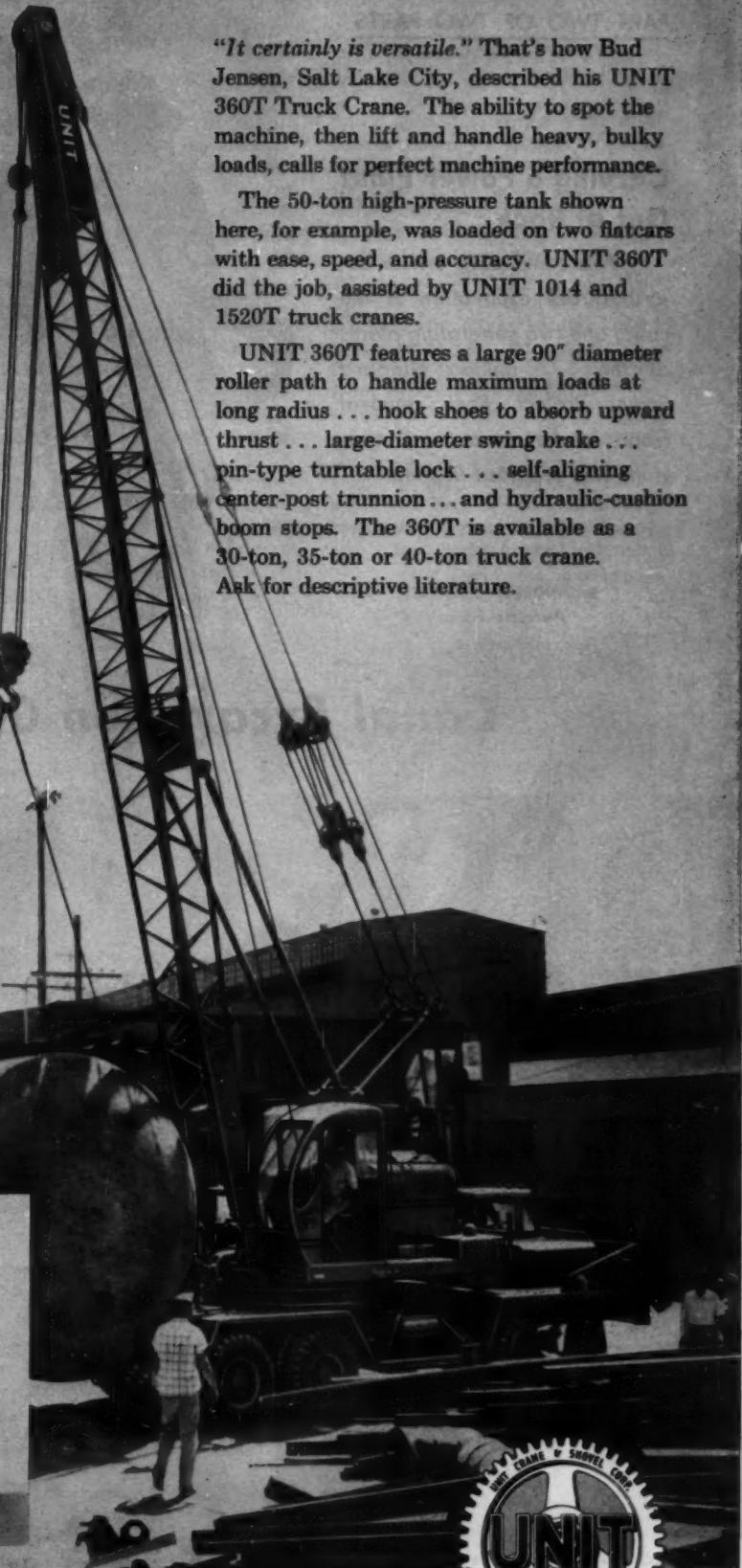
move ahead with ALLIS-CHALMERS
...power for a growing world



CAPACITY! POWER! MOBILITY!

UNIT 360T

gives
you
all
three



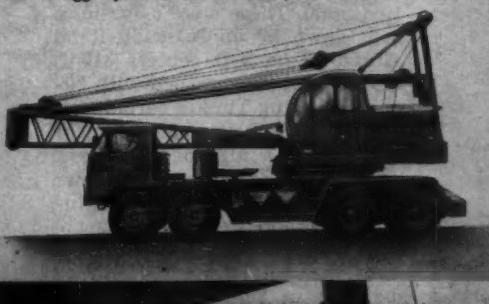
"It certainly is versatile." That's how Bud Jensen, Salt Lake City, described his UNIT 360T Truck Crane. The ability to spot the machine, then lift and handle heavy, bulky loads, calls for perfect machine performance.

The 50-ton high-pressure tank shown here, for example, was loaded on two flatcars with ease, speed, and accuracy. UNIT 360T did the job, assisted by UNIT 1014 and 1520T truck cranes.

UNIT 360T features a large 90" diameter roller path to handle maximum loads at long radius . . . hook shoes to absorb upward thrust . . . large-diameter swing brake . . . pin-type turntable lock . . . self-aligning center-post trunnion . . . and hydraulic-cushion boom stops. The 360T is available as a 30-ton, 35-ton or 40-ton truck crane.

Ask for descriptive literature.

UNIT 360T traveling along highway. Note counterweight on carrier frame over trailing front axle, stub boom in cradle, and outrigger jacks seated in fender well.



UNIT CRANE AND SHOVEL CORP.

6305 West Burnham Street, Milwaukee 19, Wisconsin, U. S. A.



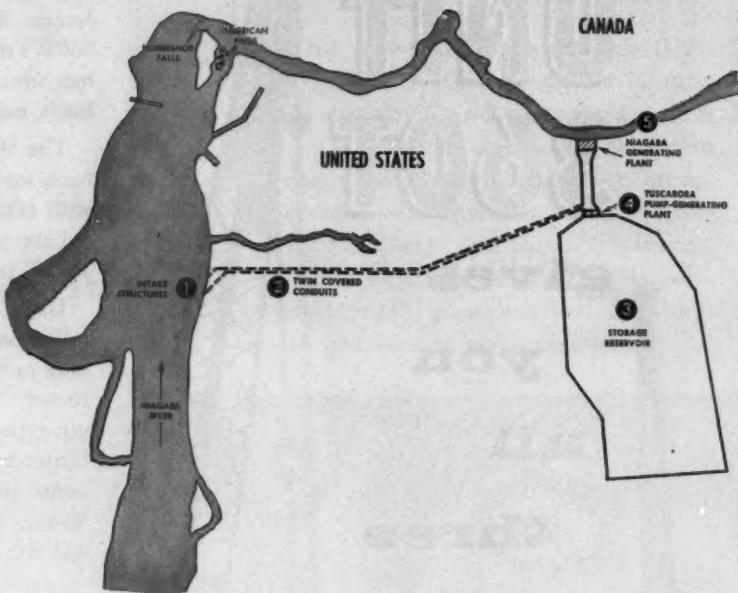
PART TWO OF TWO PARTS

After work crews completed the \$710-million Niagara Power Project's rock diversion works, they began to cut through solid bedrock. This report will cover the deepening of the canal.

Carving a Power Plant Out of Rock...

This concluding article describes rock excavation of the canal and two generating plants at the \$710-million Niagara Power Project. Rock removal from intake area and conduits was reported in June.

By ANDREW BORACCI
Associate Editor



Canal Excavation Goes Deep



LOADING—Bucyrus-Erie 150-B electric shovel designed to handle a 6-yd bucket has counterweight added so it can load rock into Easton side dumps with 7½-yd Esco dipper.

WHY CALL the rock work channel Constructors is doing on its \$40-million canal and reservoir job the neatest?

Neat is all you can call the shaping of an open canal almost 110 ft deep that also serves the purpose of supplying rock going into aggregate production for all contractors on the project and fill for the huge water storage reservoir.

The Kiewit-sponsored joint venture with Perini Corp., Morrison-Knudsen, and Walsh, is pulling 9,500,000 yd of rock from the area. Half of it is slated for aggregates production; the other half as fill for reservoir dikes and bed.

Early in the job the contractors drilled line holes to shape the entire canal. These were 6-in. holes sent down by an Ingersoll-Rand Crawl-IR on 5-ft centers 110 ft deep. Holes were drilled with 20-ft steels using Timkin carbide insert bits. Between each pair of 6-in. holes a big Ingersoll-Rand four-tower Barmaster sent down three 3-in. holes 20 ft deep to insure clean top breakage.

Working within the line hole area, the contractor takes out rock benches in 20-ft lifts. A dozen Gardner-Denver Air Tracs send



DRILLING—Drill-spread sends down blast holes to pull rock in 20-ft benches for a canal going to generating plants.

down 3 to 4-in. holes on 7x7 and 9x9-ft patterns. The drill rate is about 40 ft of hole per hour per rig.

Blast holes are loaded with 1½ lb of Atlas and DuPont 40% gelatine powders for each expected yard of pull. Atlas electric blasting caps set up in a parallel circuit detonate a 300-hole shot that frees about 18,000 yd of rock.

Loading rock are four Bucyrus-Erie 150-B electric shovels fitted with oversized 7½-yd dippers. These rigs were designed to handle 6½-yd dippers. The contractors added 5 tons of counterweight each, making use of the larger buckets possible. Result is a 25% increase in production.

"Sure it's a strain on the machines," says a spokesman, "but the production increase makes it worthwhile to work the rigs to death."

Shovels load into 30-yd Easton side dumps of 20-yd capacity drawn by butane-powered Euclid tractors. Trucks move up a series of ramps to haul rock 2 miles away to the crusher plant (CM&E, March 1959, P. 90), or to the reservoir site 6 mi away.

The contractors have a neat operation going for them in the construction of a rock and earth-fill

dike 60 ft high that will retain water in the storage reservoir.

The dike will have a compacted earth fill flanked on both sides by 2 ft of sand filter and 2 ft of crushed rock filter. Over this will go a crushed rock fill shaped to 2-on-1 slopes.

Most of the fill is being dumped directly into place by the side dumps while Caterpillar D8's doze it into shape. But a specially made rig puts down both sand and crushed rock filter material simultaneously in 3-ft lifts with a dual slip form.

Key to this operation is a modified Euclid bottom dump wagon. This is divided into two compartments: the forward one carries a load of crushed stone, the after

one a load of sand. Each material passes down its hopper through an air-actuated trip gate and onto its own 10-ft horizontal transverse conveyor suspended from the bottom of the wagon. Hydrex hydraulic pumps power the conveyors, which are fitted with Barber-Greene rollers and idlers.

The form leaves behind it two 2-ft swaths of sand and stone 3 ft high. Conveyors are operated from controls set behind the Euclid's cab.

Lee Rowe is project manager. He is assisted by shift superintendents Ed Pearson, Ray Shepard, and Ray Condos, Lynn Arbogast, equipment superintendent, and Frank Dicky project engineer.

continued on next page

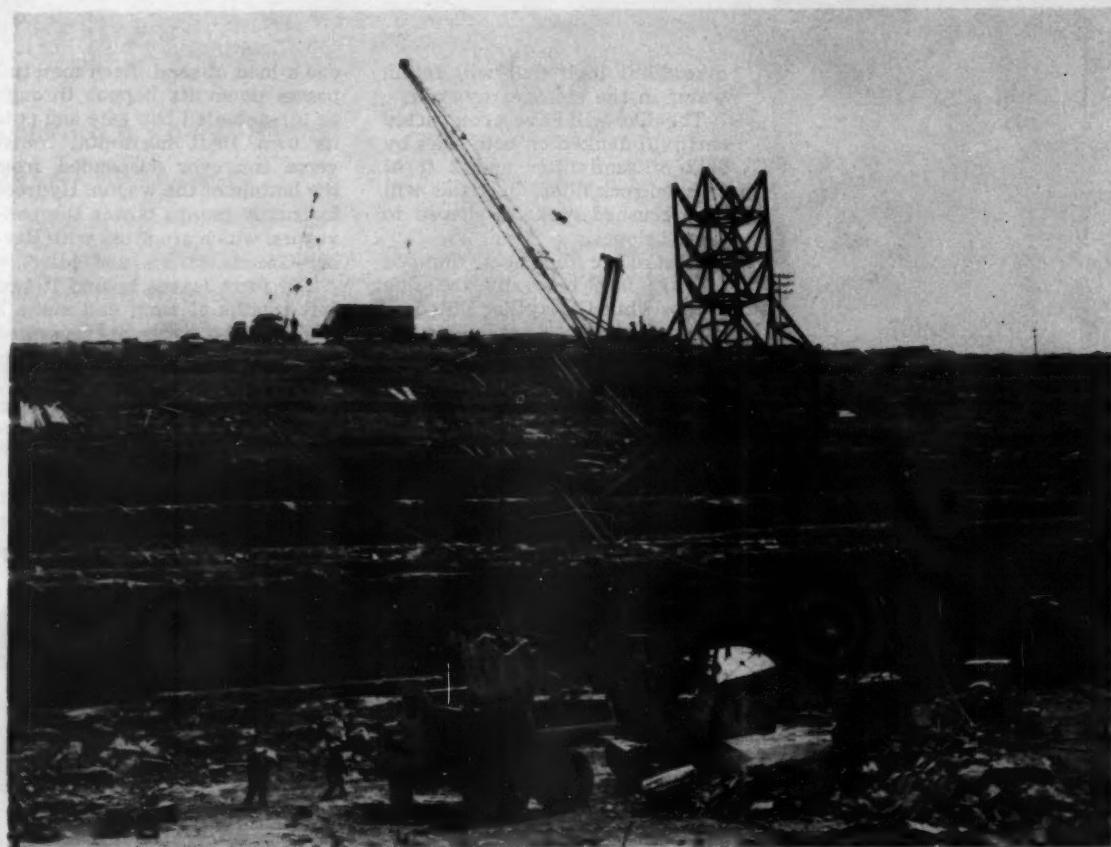


A NEW RIG—Modified Euclid bottom dump dragging novel slip form places 2-ft-wide sand and gravel filters in 3-ft lifts.

PLACES FILTER ZONE—Two adjustable conveyors fitted under truck carry material to the three-bladed steel slip form.



CARVING A POWER PLANT OUT OF ROCK...continued



MUCKING—Northeast shovel loads fractured rock into Euclid rear dump in excavation of Tuscarora pump-generating plant. Stair-

like benches cut in rock so cleanly will serve as foundations for draft tubes, penstocks, and dual-purpose concrete power plant.

Carving Foundation Demands Care



SETTING CHARGES—Workmen clean out blast holes and load cartridges to prepare for a shot which, in 1 to 10 delays, will pull between 13,000 and 17,000 yd of dolomite.

WHY CALL the rock excavation at the \$40-million Tuscarora pump-generating plant the classiest?

You have to call it that—or any other term that comes to mind when you see a rock job that so closely resembles the carving of presidential heads in Mount Rushmore rock. The rock work in the 400x800-ft area is necessary to seat plant foundations. The plant will pump water into a storage reservoir during the night, and generate electricity during the day as stored water flows out again to move through a canal to the main generating plant at Lewiston. But the rock foundation is being carved in stair-like fashion flanked with smooth-walled buttresses 110 ft high.

The Arundel sponsored joint venture with L. E. Dixon Co. and Hunkin-Conkey Construction Co.

subcontracted the removal of about 1,000,000 yd of overburden to the William Ruppert Co. With a fleet of Caterpillar and Euclid scrapers Ruppert cleaned the area down to rock last year. The Tuscarora group then took over.

Much in the way a sculptor roughs a block of granite, the contractors drilled a series of line holes to outline the shape of the buttresses and risers of the rock foundation for the pump-generating plant. Six Gardner-Denver Air Tracs, two Ingersoll-Rand Crawl-IR's, and an Ingersoll-Rand 4-drill Barmaster, working around the clock, send 2½-in.-dia line holes to varying depths—some up to 50 ft—on 9-in. centers to neat perimeter lines.

Around the canal area, where the rock face will remain exposed, they drill intermediate

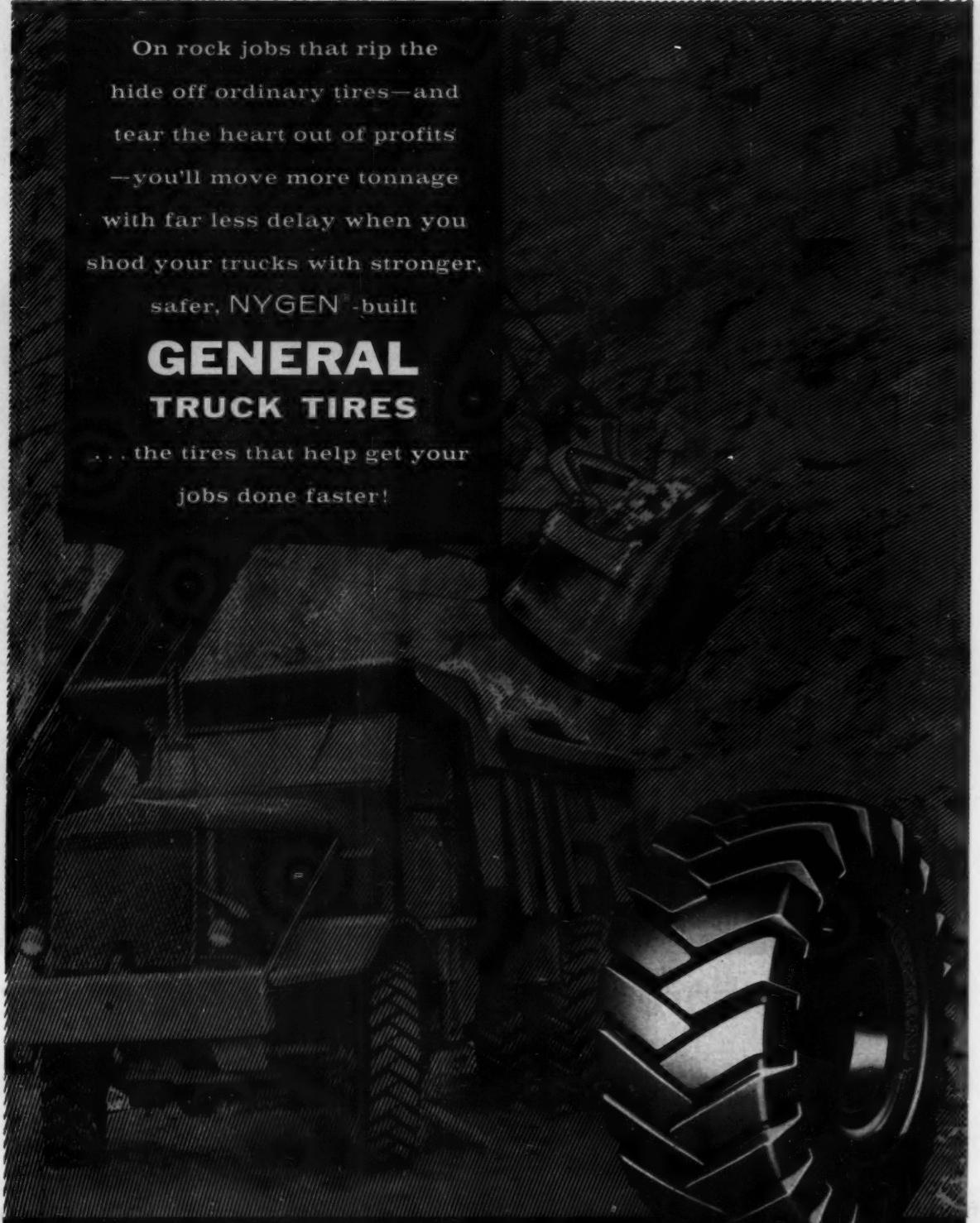
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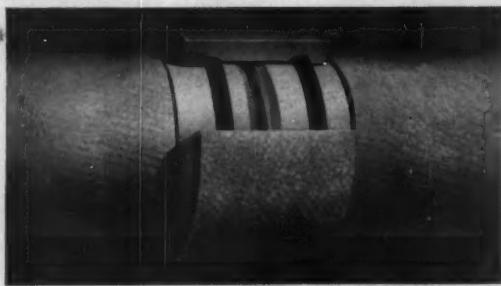
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CARVING A POWER PLANT...

continued

holes $4\frac{1}{2}$ in. in dia 6 ft deep between the main line holes. These insure smooth, clean breaks around the rock ridges. Line holes are not loaded.

Main rock excavation is handled in a series of benches cut out mostly in 20-ft lifts.

For each bench, the contractors drill from 300 to 400 holes 3-in. in dia 20 ft deep on a 7x7-ft pattern. The equipment that drilled the line holes also handles this as-



HAULING—Fleet of Euclid rear dumps moves up and down winding haul road between excavation area and one of many spoil piles designed for storage of rock.

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signment. Air for drills comes through 8-in. main, 6-in. branch, and 4-in. lateral lines. It is supplied by three 4,000-cfm Joy stationary compressors on the site, two Ingersoll - Rand stationary plants, and a Gardner-Denver 2,600-cfm rig.

Holes are loaded with 1 lb of powder per yd to be shot. The contractors employ a wide variety of explosives. These include Hercules 40% Gel Extra, Gelamite, and 40% Extra Dynamite, DuPont Special Gel 40%, HiCap, and Red Cross Extra, Atlas Giant Gel 40%, RXL 40%, and Gelatine Extra.

The higher velocity powders are used on upper levels to insure clean breakage against canal edges. They are also used where harder cap rock is encountered. Breakage is very clean, though, for most of the dolomite being cut lies in horizontal strata.

Charges are connected in a combination of series and parallel circuits. Atlas electric blasting caps detonate each shot in from 1 to 10 delays to pull between 13,000 and 17,000 yd of well-fractured rock. One shot is fired each day.

Working three shifts a day, 19 Euclid 27-ton end dumps haul rock up a rock-fill ramp to stockpile areas. They are loaded by two Bucyrus-Erie 88-B shovels with 4-yd dippers, two Northwest 80D's with 2 1/4-yd dippers, and a Northwest Model 6 backhoe.

The men heading the Tuscarora job include W. B. Greeley, project manager, E. E. Synder, general superintendent, Robert J. Koch, project engineer, and Elmer B. Minser, blasting superintendent.

continued on page 141

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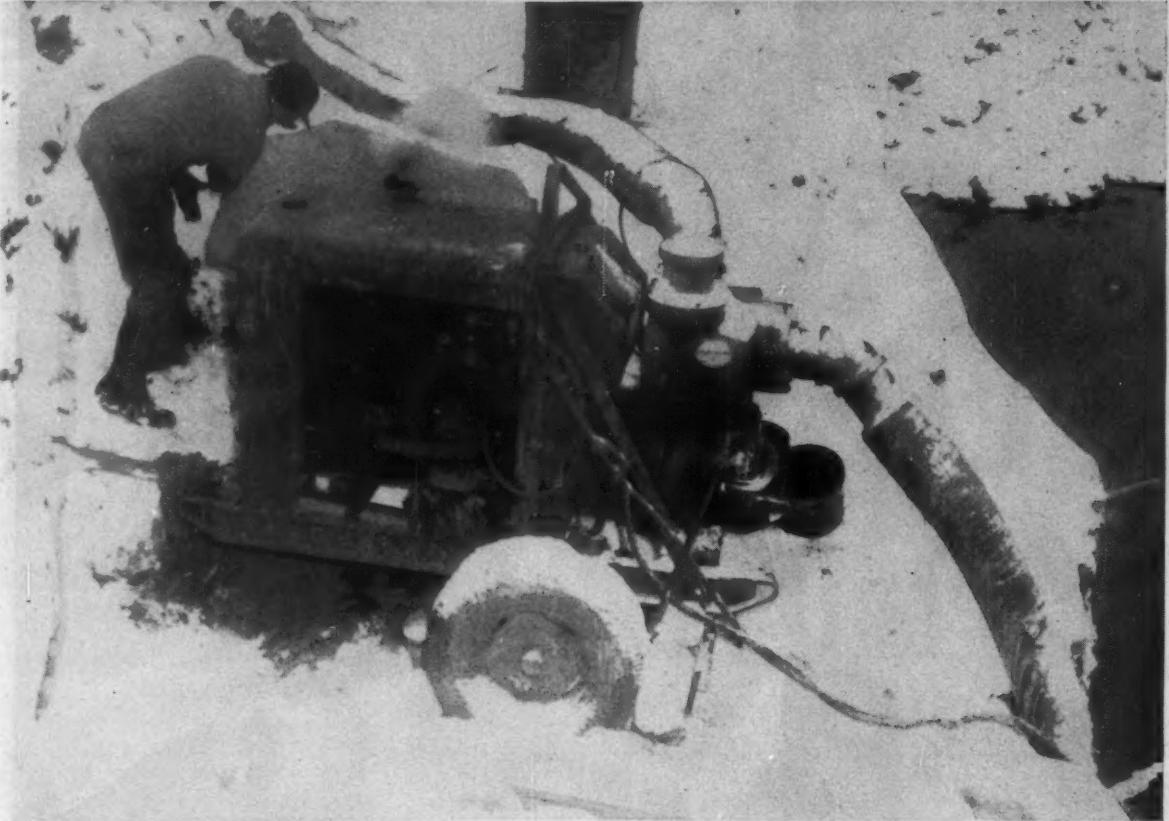
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AWESOME—Buttress walls, draft tube foundations, and keys for penstocks are cut into rock cliffside 150 ft high. They dwarf fleet of

drills, trucks, cranes, and shovels at work inside cofferdam. Men and machines are removing nine different types of rock here.

CARVING A POWER PLANT OUT OF ROCK... *continued*

Pre-Planning Speeds Rock Removal

WHY CALL the 9,500,000-yd rock excavation at the \$98-million Niagara Generating Plant being handled by Merritt-Chapman & Scott awesome?

You pass through all four of the previous jobs then come to this one and catch your breath. You stand at the base of the cliff in the protected confines of a 60-ft-high rock and earth cofferdam. You see 13 brilliantly colored vertical penstock keys carved in the rock cliff face rising to a height of 150 ft. On each side of the keys you see rounded, smoothly carved buttresses of grayish dolomite. The overall impression can only be called awesome.

The contractor put some clever planning into the work. Late last year, while mass rock was being excavated to ready the cliff for

the more-fancy rock carving (CM&E, Jan., p. 58), blasting crews sent down vertical line holes outlining the walls of the keys. These were drilled through some nine different types of rock. They include Rochester shale, Irondequoit limestone, Reynales dolomite, Clinton shale, Thorold Limestone, Grimsby sandstone, Power Glen shale, Whirlpool sandstone, and Queenstown shale.

Drilling line holes in the midst of other rock excavation were four Gardner-Denver HT 124 Air Tracs and an Ingersoll-Rand two-tower Linebar. Line holes were $2\frac{1}{4}$ in. dia drilled on 9-in. centers to depths of up to 60 ft. Holes were left until mass excavation was completed and other preliminary site work got under way.

Some of the preliminary site work involved throwing a cofferdam of earth and rock 50 ft high and 1,900 ft long across the base of the cliff to permit digging a foundation pit for draft tubes in the dry, and to serve as a haul road between up and downstream work areas.

When the cofferdam was completed, the contractor bored $2\frac{1}{2}$ -in. test holes with a Chicago-Pneumatic CP65 drill on 80-ft centers up to 100 ft deep. These were used to test water seepage through the cofferdam. To reinforce the dam, additional holes were drilled on a 20x40-ft pattern. These, along with the test holes, were plugged with grout-filled steel piles.

In the cofferdam confines, rock is being benched out in 15-ft lifts



LINWORK—Ingersoll-Rand four-tower Barmaster drills 2½-in. line holes in buttress ledge on 9-ft centers to depths of 60 ft.



DRILLING—Drills send down 3-in.-dia holes on 8x8-ft pattern. Each hole will be loaded with 0.6 lb of powder for each yd of rock pulled.

CARVING A POWER PLANT OUT OF ROCK... continued

to a depth 60 ft below the river's level. A fleet of drills that includes 10 Joy wagon drills, three Gardner-Denver HT 143's, and six Gardner-Denver HT 124 Air Tracs, along with two Ingersoll-Rand Linebars drill 3-in.-dia. holes on 8x8 and 12x12-ft patterns. Drills handle Crucible steel in 10- and 20-ft breaks with Brunner & Lay carbide Rok-Bits.

Shots range from 25 to 150 holes. Two out of three holes are loaded with 0.6 lb of powder for every yard of expected pull. A wide variety of powders is used. These include DuPont HiCap, DuPont Special with 40% and 60% gelatine, Red Cross Extra with 40 and 60% gel, DuPont Nilite and Nitramite. Also used are Olin-Mathieson powders such as Olinite, Olin Special with 40 and 60% gelatine, Special 40% dynamite, and Olin Minegel. Atlas powders include Amacore, Giant Gel and 40 and 60%, Atlas 40% extra dynamite, Grantite, and RXL 209.

Shots are fired by DuPont and Atlas Electric blasting caps connected in combined parallel and series circuits to detonate the charges in 1 to 16 delays. Each shot pulls an average of 5,000 yd of rock. Shales fracture in 6 to 18-in. sizes while the dolomite fractures in from 12 to 30-in. pieces.

Rock taken from within the cofferdam is loaded by five Lima 1400's with 6-yd dippers, two Marion 111-M's with 4-yd dippers, a Bucyrus-Erie 54-B with a 2½-yd dipper. Shovels load into a fleet of more than 80 Euclid end-dump trucks and International Harvester Payhaulers that carry

material up rock ramps for haul to a spoil area 1½ mi downstream.

In the penstock area, Joy drills work between the previously drilled line holes. They send down 3-in. holes 20 to 40 ft deep with Brunner & Lay carbide Rok-Bits. The closer patterns are employed when drilling is being done in the harder rocks; wider patterns are used on the softer rocks. Some 40 holes are drilled for a shot.

All are loaded with an average of 0.5 lb of the Olin and DuPont powders for each yard of expected pull. DuPont electric blasting caps connected in series and parallel circuits set off shots in 1 to 16 delays to pull an average of 2,000 yd of rock. After a shot, rock cascades down the cliffside where the shovels working in the cofferdam area load it into waiting trucks.

Flanking the penstock area is some classy rockwork, similar to that going on at the pump-generating plant. Here, 2½-in. line holes are sent down to 30-ft depths on 9-in. centers to trace the finished buttress lines. For each shot, the contractor drills between 25 to 150 vertical 3-in. blast holes 30 ft deep on 8x8 and 12x12-ft patterns.

Holes are loaded at an 0.6-lb powder factor and are detonated with electric blasting caps set up in combined series and parallel circuits. Each shot pulls the burden free from the line holes to leave slick, relatively smooth surfaces that require little more attention than scaling.

Occasionally, a shot leaves some rough ledges. To break these, the contractor drills a hole and loads

it with a pound of powder for each 6 ft of hole and stems between cartridges with ½-in. crushed rock.

Part of the job is a 7x9-ft horse-shoe-shaped drainage tunnel that passes through the rock for a distance of about 2,000 ft. To drill this a jumbo mounting three Joy T350 rigs horizontally drills a 5-hole burn cut 8 ft deep. Holes in the burn cut are 1½-in. dia. The jumbo then drills a 24-hole circular pattern of the same diameter holes 8 ft deep.

Holes are loaded heavily. Each gets 6 lb of powder for each yard of expected pull. This is designed to increase the throw of a shot to get fractured rock within range of an Eimco loader while work goes on at the heading.

The loader throws rock into 2½-yd muck cars piled by a 45-hp Plymouth dinkey over a narrow-gage track system. Rock is hauled to the portal where it is dumped and cascades down the cliff face towards shovels working around the cofferdam area.

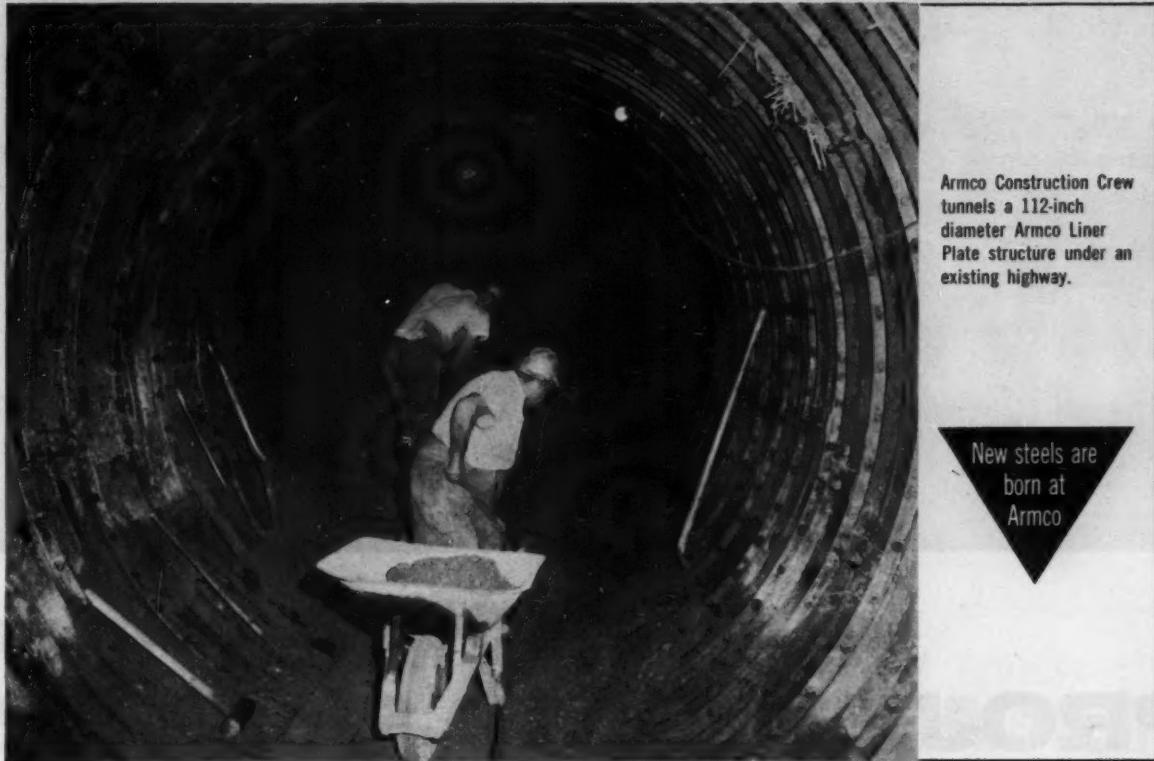
All air for drilling comes from two Joy WN224 stationary units set up in a cliff-top compressor house.

The contractor works three shifts a day averaging four shots a day or 24 shots a week. MC&S tries to maintain a shooting schedule that restricts blasting to shift and meal breaks. These come at 12:30 p.m., 4:30 p.m., 8:30 p.m., and 12:30 a.m.

Heading the work for MC&S is Herbert Booth, project manager, Bill Olsen, assistant project manager, Elwin Simpson, general superintendent, and C. S. Mason, project engineer.

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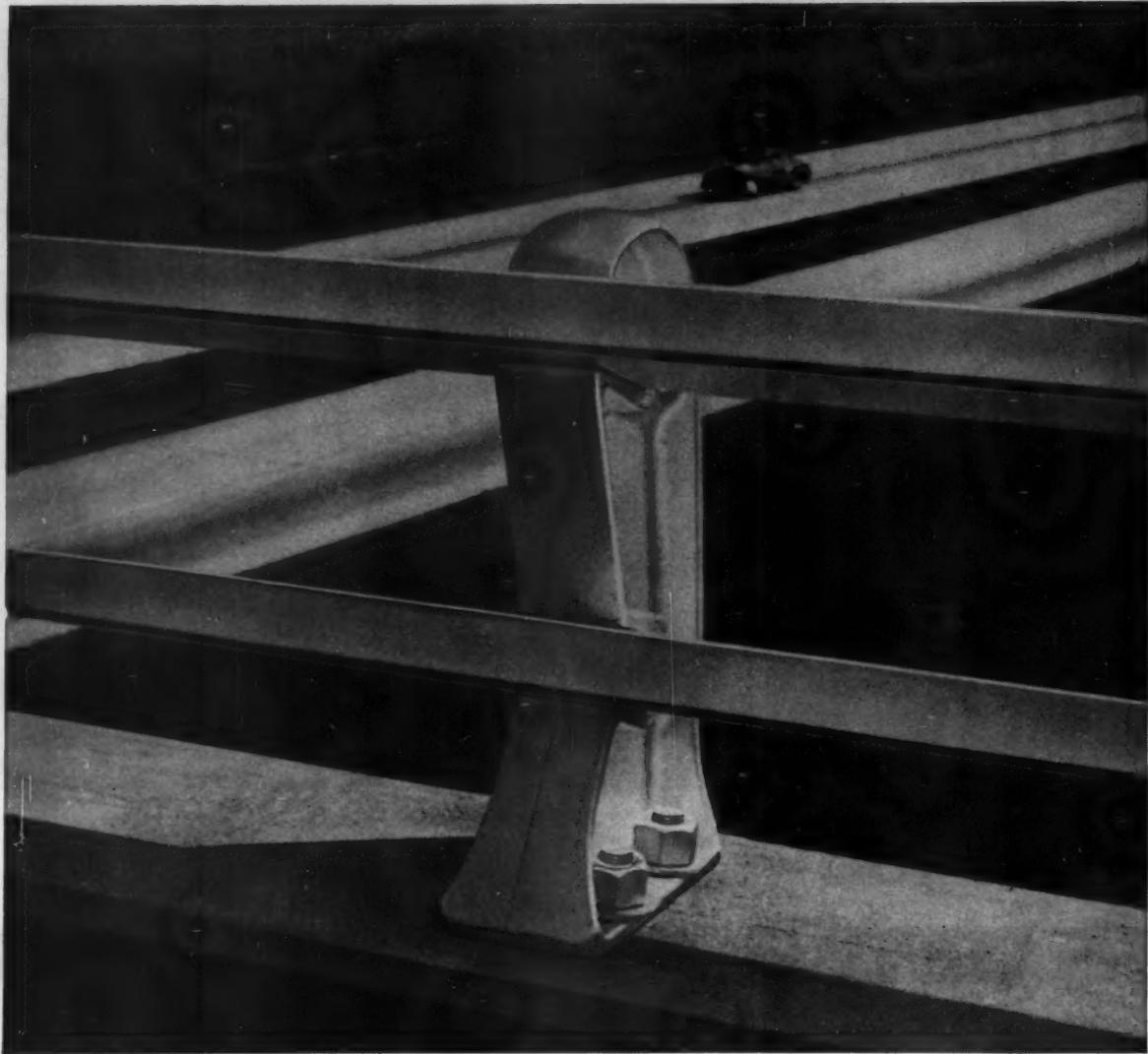
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Big Fleet of Earthmovers

When S. J. Groves was awarded a \$13.6-million contract to build Bong Air Force Base in Wisconsin, they started fast with a fleet of 165 major earthmoving rigs. In the first 15 weeks on the job, they moved 8,500,000 cu yd of earth.

AN IMPOSING LINEUP of earthmoving equipment that includes 165 major machines is making short work of one of the biggest airfield construction jobs in the country.

S. J. Groves & Sons Co., of Minneapolis, assembled this fleet of machines for their \$13.6-million contract to build the runways and taxiways for the Richard I. Bong Air Force Base at Kansassville, Wis., about 60 mi north of Chicago. The base is being built for the Strategic Air Command; the Chicago District of the Corps of Engineers is acting as construction agent.

Groves got the contract just over a year ago. During the first summer, they moved in forty-two 17-yd scrapers and 46 bottom dumps along with dozens of bulldozers and other machines. In 15 weeks they moved 8,500,000 cu yd of earth out of a total of 13,600,000 cu yd in the contract.

This year they will finish the bulk of the earthmoving and get started on the paving. The job is

scheduled for completion by the end of 1960.

The main elements of the contract are a 12,300-ft-long by 200-ft-wide runway, a 75-ft parallel taxiway, four 75-ft connecting taxiways, and operational aprons. Average thickness of concrete pavement is 16 in.; the job will require 500,000 cu yd of concrete.

As part of the contract, Groves stripped 1 ft of topsoil from the whole area and stockpiled it for later landscaping. They plan to lay the topsoil on finished grade as soon as possible, perhaps this fall, to keep dust down.

A big part of the job is laying drainage pipe. About 17,000 lin ft of storm sewer, ranging in size from 20 to 96 in., has to be installed. In addition to this, 60,000 lin ft of 6-in. subdrain has to go under the paved areas.

A Northwest 95 dragline with 3-yd bucket handles trench excavation for the larger sizes of pipe; a Link-Belt Speeder crane places the pipe. Crews backfill the trench with sand, tamping it with a pair

of Jackson electric hand tampers.

Earthmoving

With so many machines moving around the area, Groves had to plan the layout carefully to prevent congestion. They work in about five major cut areas at the same time and have laid out the haul roads so that rigs from one cut area can travel to their disposal area without mingling with rigs from another cut.

It is important to keep the haul roads in top shape and Groves has assigned a small fleet of equipment to the task. Eight Cat No. 12 graders, two Galion T700 graders, and a 4,000-gal water truck patrol the roads constantly.

A long period of fine weather helped considerably during the first phases of the earthmoving. Once the operation got rolling, Groves had 400 men working two 58-hr work weeks. In the two 10-hr shifts per day they were moving up to 7,000 loads or 130,000 cu yd of earth. Over the first summer they averaged 700,000 cu yd



ORDERLY LINEUP OF RIGS IN A CENTRAL LOCATION MAKES MAINTENANCE AND REFUELING MUCH EASIER.

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per week. Average haul distance was 1 mi.

Groves achieves this kind of production by keeping their machines in good shape all the time. They check the machines and lubricate each rig daily.

To make it easier for the servicemen, all rigs converge on one central spot during lunch breaks and between shifts. They line up in a straight line so repairmen and fuel trucks can reach them easily.

Six fuel trucks service the fleet. During the peak of the earth-moving operations, the machines consumed 20,000 gal of diesel fuel and 800 gal of motor oil a day.

Some of the scrapers come to the rendezvous full of earth. After the break they proceed directly to the fill area. This reduces the lineup of rigs at the cut areas during the start up period and makes more efficient use of the machines.

The soil varies over the area. Most of it is inorganic clay and muck with several deep swampy spots and underground water veins scattered over the site. There are a number of exposed glacial boulders and concealed pockets of peat.

The boulders interfere somewhat with scraper operations. Those that are too big to handle

in the scrapers are moved out of the way by bulldozers with rock rakes and are hauled away separately.

The two or three biggest swampy pockets cause more trouble. Groves has to remove mud and peat down to a depth of about 20 ft and replace it with clean fill.

Two Northwest 95 draglines with 3-yd buckets, a 2½-yd

Northwest 80D dragline, and a Bucyrus-Erie 71-B dragline handle the excavation. Bulldozers, working right down in the soft spots, push the muck within reach of the draglines working on the high hard ground around the swamp. The draglines load the muck into Euclid bottom dumps for removal.

Filling the low spots is a slow



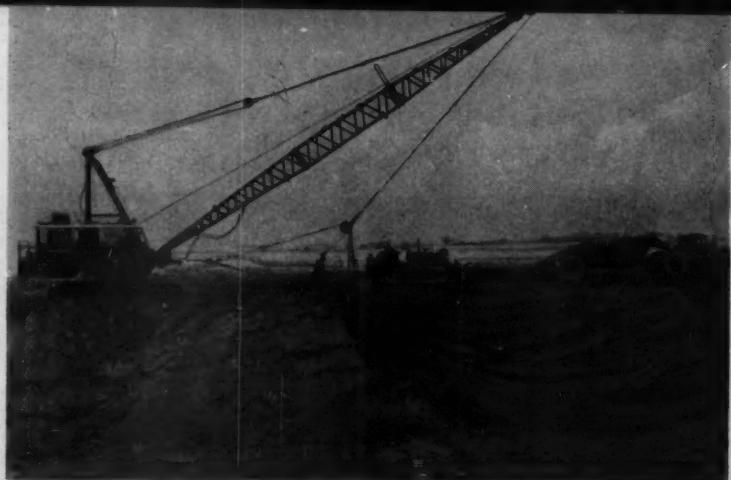
STORM SEWER—Three-yard dragline bucket takes bite of earth from excavation for large size storm sewer pipe. Link-Belt crane in background handles pipe sections.

BIG FLEET OF EARTHOVERS ...

continued

process because the fill has to be placed in 6-in. lifts. This means as many as 40 lifts in the deeper fills. Cat dozers spread the fill. Some of it has to be disked to cut chunky clay or to dry fill with excessive moisture content.

Generally, the fill in all areas is wetter than the optimum moisture content, so little sprinkling is necessary during spreading. Ten LeTourneau - Westinghouse Model 120 dual drum sheepsfoot



SOFT SPOTS—Bucyrus-Erie 71-B dragline removes muck and peat from one of several soft spots in the area and loads it into bottom dump for removal to spoil area.

BOOST PRODUCTION...cut downtime with WISCONSIN-POWERED equipment!

NEW PULVERIZER attachment on bucket loader enables one machine and one man to strip, pulverize, load clay and topsoil in a single operation. Made by Barber-Greene Co., Aurora, Ill., the unit is powered by a V-type, 4-cylinder 37-hp VG4D Wisconsin engine.



BITUMINOUS DISTRIBUTOR, made by Municipal Supply Co., South Bend, Ind., is said to spread over 18,000 gallons of material per day. Power for this grueling, extremely hot work is supplied by a 37-hp Wisconsin 4-cylinder VG4D air-cooled engine which is completely enclosed, away from oil spray.



VIBRATORY COMPACTOR, made by the Seaman-Gunnison Corp., Milwaukee, Wis., packs a 12-ton wallop for compacting a wide range of soils and granular materials to rigid highway and airport density specifications. Powered by an 18-hp THD 2-cylinder Wisconsin engine, unit can also be used as a static roller.



You pay for workhours — not manhours — when you use Wisconsin-powered equipment on your construction jobs. That's because Wisconsin engines minimize power shutdowns — keep men and machines busy around the clock, regardless of weather.

Wisconsin engines outwork and outlast other engines of their type and size. They start fast — deliver steady load-lugging power that shrugs off the effects of sudden shock loads.

Air-cooling cuts engine size and weight — eliminates up to 26 wear parts used on water-cooled engines. You don't have to worry about summer dry-ups or winter freeze-ups, anti-freeze, fan belts, clogged radiators, etc.

Leading builders include Wisconsin heavy-duty, air-cooled engines on their mechanized equipment by choice — not by chance. For the many dollars-and-sense benefits, specify Wisconsin engines on the equipment you buy. Sizes from 3 to 56 hp. All models can be equipped with electric starting. Write for Bulletin S-237.



WISCONSIN MOTOR CORPORATION
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

AD-6516-3

rollers handle compaction. No vibrating equipment is required.

Groves pushed hard on fill areas in the early part of the job because the Corps of Engineers specifications required that completed subgrade and base has to stand for seven months before the pavement is laid when pavement embankments commence below elevation 795.

Subbase material comes from a crushing plant off the site. It is hauled to the base and stockpiled in two piles. One pile contains sand; the other, 1-in. aggregate. The stockpiles normally contain about 160,000 tons of material. Two Cedarapids pugmills mix the material and a conveyor loads it into the trucks.

Groves has set up a large maintenance program to keep the equipment in top shape. Their maintenance shop is a 120x60-ft Butler prefabricated building that contains six work bays. One bay is used for storage of spare parts; each of the other five bays can service one major rig.

In the shop 40 mechanics handle big repairs and overhauls on the equipment. An additional 20 mechanics travel around the site in pickup trucks to handle minor repairs and service right in the field.

For Groves, A. J. Mackay is project manager, E. D. (Red) Sargent is general superintendent, A. B. Marlow is area engineer, F. Tomsky is field engineer, P. J. Gebhardt is office manager, and R. Hartman is safety superintendent.

Major George L. Shumaker is resident engineer for the Corps of Engineers. Colonel Charles E. Lancaster, Jr., is base commander for the USAF.

The r
shape
right



**Ask the man who
runs the job!**

*...no one makes a
tougher tooth
than ESCO*



**The construction industry
looks to**



The right design, the right steel, the right shape make *ESCO* Points and Adapters right for every digging condition.



Electric Steel Foundry Co., PORTLAND, OREGON

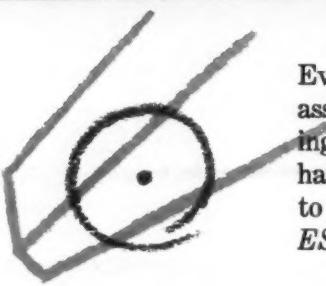
See reverse for shapes and size range >

Here are the points to remember...

12M ALLOY STEEL

ESCO 12M Points are the toughest you can buy. Developed through years of research for the construction industry, cast ESCO 12M is carefully heat treated to produce the finest steel made for the severe shock and abrasion encountered by points and adapters.

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CONTROL TESTS
ASSURE
TOUGHNESS,
HARDNESS



Every ESCO Point is Brinell tested to assure the exact degree of shock-absorbing toughness and abrasion-resisting hardness for longer digging life. Be sure to look for the Brinell mark on every ESCO Point you buy.

8 POINT SHAPES

You can select from eight different shapes to find the point that matches your digging conditions. ESCO Points are designed by bucket and excavation specialists who know how to achieve top digging performance. The self sharpening design of an ESCO Point makes it start sharp and stay sharp.

ESCO Points and Adapters for all digging equipment

Your local ESCO dealer can supply Points and Adapters for all your digging needs. By using ESCO Points and Adapters on all your equipment you can cut costs further by reducing your point inventory and consolidating purchases. Call your ESCO dealer today for details. He's listed in the yellow pages of your telephone directory. Or, write direct.

LITHO IN



ESCO Point shapes... start sharp, stay sharp and last longer under any digging condition.



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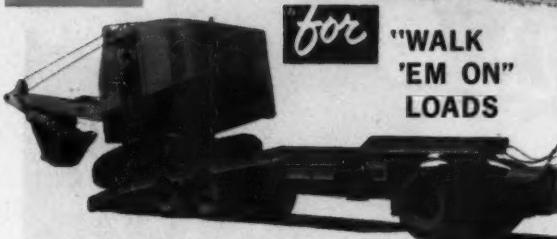
ROGERS STILL

The Original Low Bed Trailer THE POPULAR PREFERENCE



for

QUICK LOADING AND FAST MOVES



for

"WALK
'EM ON"
LOADS

Rogers Tilt-Deck Trailers are advantageous for hauling certain types of equipment—they load easily and are built in single and double axle models for varied requirements.

Some units have drawbars; others goosenecks for use with standard fifth wheels.



for

GREATEST VALUE

The Rogers TVT Trailer is well named since it presents a value not even approached in any other trailer.

Rogers long experience, specialized engineering talent and uncommon facilities have produced units that have great capacity in proportion to weight, which haul and handle well and brake efficiently. The sloped deck facilitates loading.



for

"LONG
JOHN"
LOADS

Rogers Pole Trailers are popular for hauling stacks, tanks, pre-stressed beams and other long objects.

Drawbar extends to maximum reach or telescopes to minimum length for fast, safe return trips. Removable to meet special requirements as here illustrated.

Available with self-contained power steering for easy turning and maneuvering.

ROGERS BROTHERS CORP.

ALBION, PENNSYLVANIA



August 1959 — CONSTRUCTION METHODS and Equipment — Page 153

**EXPORT OFFICE: 50 CHURCH STREET
NEW YORK 7, N. Y., U. S. A. CABLE**

August 1959 — CONSTRUCTION METHODS and Equipment — Page 153

New Caterpillar D8 Tractor

equipped with

Perfect Circle Chrome piston rings



Turbocharged engine delivers 1,150 foot-pounds of torque to push 13-foot wide, 10-ton pile of earth!

Caterpillar's new D8 crawler Tractor can operate in water four feet deep. It works in 50 below zero weather. Teamed with a scraper, it can pushload 18 yards of earth in a scant 40 seconds.

Heart of the D8's power is a 6-cylinder engine which produces 225 flywheel horsepower and delivers a maximum of 52,250 pounds drawbar pull. Its turbocharger utilizes normally wasted exhaust gases to pack more air into the cylinders for more

efficient torque characteristics.

Working together, Perfect Circle and Caterpillar engineers developed the chrome-plated piston rings used in the D8's engine. The top compression ring is plated with thick, solid chrome on special high strength, heat-treated, centrifugally cast iron. For oil control a Perfect Circle Chrome "86" oil ring is used. It features thick solid chrome-plated faces to give long life under the severe operating conditions en-

countered by Caterpillar earth-moving equipment.

Perfect Circles do not require tedious break-in. Rings are preseated at the factory. Perfect Circles give thousands of hours of positive oil control and double life for pistons, rings, and cylinders.

Perfect Circles are used by Caterpillar for both original factory equipment and for replacement. So when your "Cat" engine needs increased efficiency, see your Caterpillar dealer for an engine overhaul and a new set of rings made by Perfect Circle.

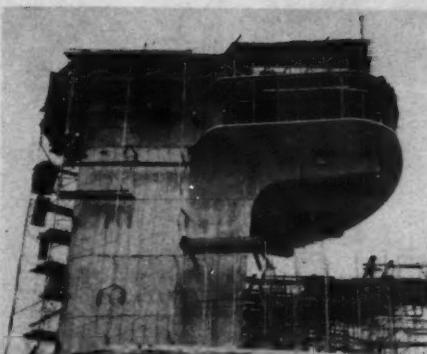
PERFECT CIRCLE

PISTON RINGS

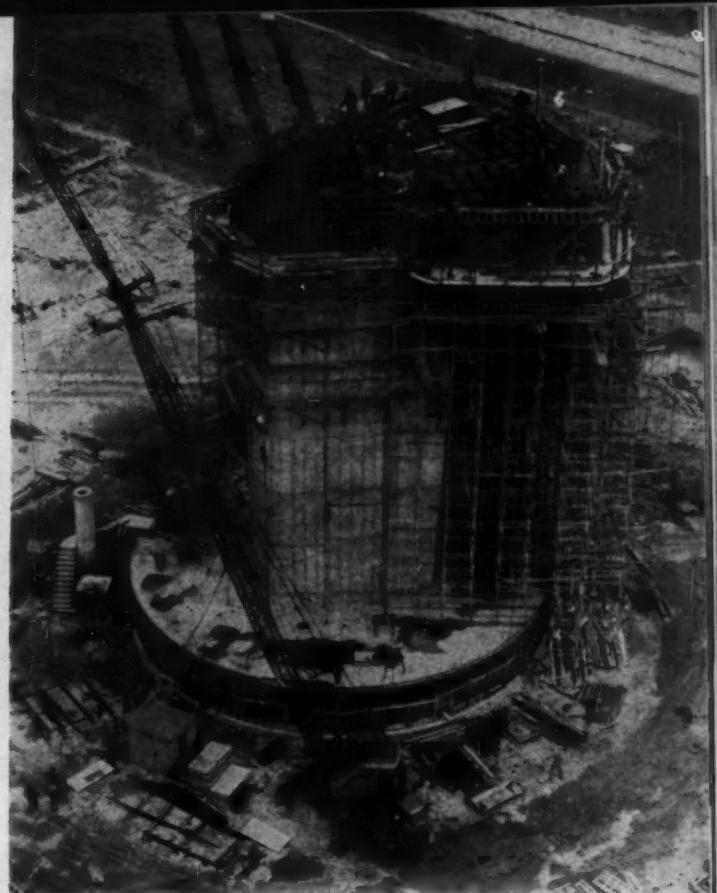
POWER SERVICE PRODUCTS

Hagerstown, Indiana

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CANTILEVERED SLAB—Ribs jutting from core of control tower at New Jersey's Newark Airport cradle fan-shaped 7½-in. reinforced concrete slab that cantilevers 37 ft out at a height of 75 ft above the ground.



FOREST OF SCAFFOLDS—Patent's tubular scaffolding towers reach up eight stories to support forms while P&H crane with 120 ft of boom buckets concrete into place. Tyscrus that held core forms anchor scaffolds to the tower's main concrete core.

Steel Towers Shore High Slab

HOW DO YOU SUPPORT forms so you can pour a cantilevered concrete slab 75 ft in the air?

That's the problem Carl Buhr, Inc., New York general contractor, faced during construction of a control tower at Newark Airport in Newark, N.J.

The tower, part of a New York Port Authority expansion program at the field, is a pile-supported structure rising 150 ft above the ground. A circular first floor structure 11 ft high and 80 ft in dia supports a concrete core 139 ft high.

Buhr erected the first floor structure and the core structure easily enough. But at the 75-ft-level of the core, he had to construct a 2,225-sq-ft fan-shaped slab 7½ in. thick with four supporting ribs 2 ft wide. The slab cantilevers out 37 ft from the core. Specifications called for the ribs and slab to be poured monolithically.

Buhr elected to support rib and slab forms with a carefully engineered framework of Patent Scaffolding's tubular steel scaffold

towers. He anchored the towers to the core structure and based them partially on the roof of the circular first floor building and partially on the ground. The latter he positioned on mud sills, tested for a maximum of 3,800 lb per shore leg.

To shore the rib forms Buhr set up rows of scaffold frames 2 ft wide spaced on 2 to 3-ft centers. Adjustable U-heads atop the frame legs carried 4x6-in. stringers bridged by 4x6-in. joists. Joists supported 2-in. plank sheeting.

Shoring

Buhr shored the slab portion with tubular scaffolding towers made up from 5-ft-wide frames spaced 4 to 6 ft on centers. All frames were cross-braced. Screw jacks at the tops and bottoms of the tower legs provided fine adjustment during erection. Leg tops also were fitted with U-heads that supported pairs of 2x12-in. stringers topped with 4x4-in. joists and 5/8-in. plywood panels.

The entire framework was

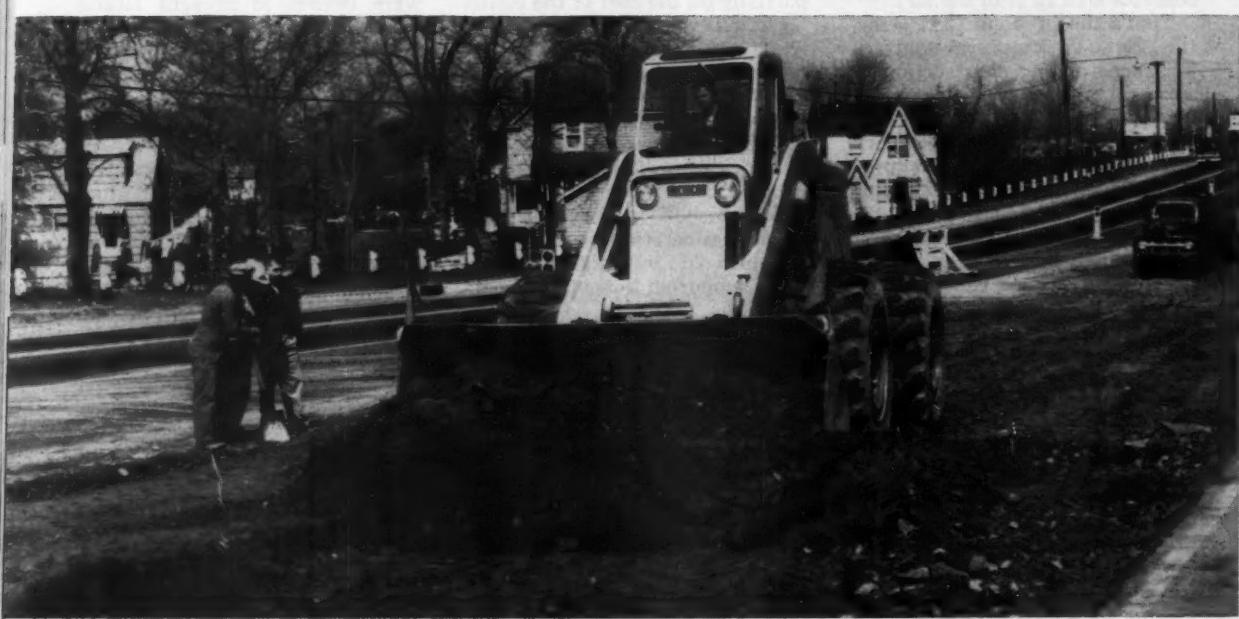
braced horizontally in both directions at four tiers. No guy wires were needed to prevent lateral motion of the framework: Buhr anchored the entire assembly to the core structure by tying it to the Richmond Tyscrus that originally served as core wall form ties.

Pouring

The contractor set reinforcing and placed a 3,000-psi concrete by bucket and a P&H crane with 120 ft of boom. The largest pour on the job took 158 yd of concrete and required nine hours to place.

The shoring framework remained in place during forming and pouring of the upper cantilevered slabs. Intermediate support came from simple vertically placed tubular frames.

Jack Hensel was Buhr's superintendent. Joseph Gavin was resident engineer for the Port Authority. Chesebro-Whitman Co. of New Jersey, an affiliate of Patent Scaffolding Co., designed the framework and provided the sectional steel shoring.



After breaking up and truck-loading asphalt pavement, Michigan cut down hump-type island, then rough-graded prior to paving. "I like its versatility, balance, speed, economy," says Owner Carmen Ottilio, . . . "also the fine service I get from my Michigan dealer, Equipment Distributors of Little Ferry, N. J."

Despite
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has 4 y

Strips 2500 yds of asphalt in 8 hours with Michigan 275A Tractor Shovel

Fast 4-yd unit helps V. Ottilio cut costs 50%

All over the country, enterprising contractors are finding Michigan Tractor Shovels can effectively handle jobs once considered much too tough for rubber-tired equipment.

Here's a case in point.

V. Ottilio & Sons, Paterson, New Jersey, widening and resurfacing a 2½ mile stretch of U. S. Route 46 near Paterson, used one of their five Michigans, a 262 hp 4 yd Model 275A, to rip up and load old pavement . . . plus handle excavation for the new roadbed.

Pavement handled, mostly asphalt shoulder cover, averaged 4 to 6 inches thick—up to 9 inches in some places—weighed about 3200 lbs per cubic yard. Ottilio found the big Michigan, working alone, handled the job 50% cheaper than could a combination of machines.

Michigan replaces swing shovel, crawlers

Before the Michigan started work, Ottilio tried a 1¼ yd swing shovel and a pair of crawler pushers. Production was good, but not good enough. So, for more loading capacity, in came the 4 yd Michigan. It worked so well, the other rigs were taken off the job. Then, contractors thought they'd speed things still further by adding a 45,000-lb-class crawler. This move proved unnecessary! The increase was so small the crawler was retired and the Michigan did the entire job!

Versatile unit handles topsoil, old pavement, rough-grading

First, the 28 mph Tractor Shovel placed barricades and flashing-light stanchions. Then it stripped and truck-loaded top soil. Next, it broke out and loaded old

pavement. Next came excavation and loading out of all dirt in the center island. Last, the Michigan rough-graded sub-base to 12 inches below existing grade. (The old road was a four-lane divided structure with 10 ft inside asphalt shoulder strip and hump-type grassed center island 28 ft wide. The new road will have two new inside third lanes, with bituminous concrete shoulders and a narrow depressed center isle). Stripping and loading production ran as high as 3,000 bank yards in 8 hours. It averaged 2,500 yards a day—compared to 1,500 yards the old way. And costs on the \$380,000 yd contract, with one machine stripping and loading instead of two or three, were down "over 50%."

Keeps 15 big trucks busy

This boost in production—and cut in costs—under the considerations of the restricted work area—was one of the biggest surprises of the job, according to Carmen Ottilio, company president. Michigan's high speed and maneuverability were responsible. The 4 yd Tractor Shovel kept a fleet of 15 trucks busy (on a 2 mile haul). It loaded each of the 14 yd haulers with three bucketfuls in about a minute.

Make your own test

Like Ottilio & Sons, many other Michigan owners are finding this Tractor Shovel actually will improve production on jobs which have never before been tried on rubber. The complete power train—torque converter, power-shift transmission, planetary axles—was designed and built by Clark, specifically engineered to give Michigans more usable power and traction than you've ever seen on rubber. For proof, ask your Michigan Distributor to demonstrate. You name the job!



Despite narrow work area between open traffic lanes, maneuverable Michigan digs, turns and dumps so fast it loads 14-yd trucks in average of 1 minute. Unit has 4 yd bucket, lifts 22,000 lbs, can make non-stop U-turn in radius of 27'5".

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

2403 Pipelines Road
Benton Harbor 31, Michigan

CLARK EQUIPMENT

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario



New machines, new ideas in

5 Michigan Tractor Scrapers and a 600 hp Michigan Tractor Dozer, on Southwest Interstate job, move 8,750 tons daily



Some new equipment and some unusual techniques are helping M. M. Sundt Construction Co., Tucson, Arizona, get an important 20% increase in production.

The new equipment includes five 375 hp, 29 yd Michigan Tractor Scrapers and a big 600 hp, 104,000 lb, Model 480 Michigan Tractor Dozer. The Scrapers are being push-loaded by the Dozer with an average of 35 tons in 35 seconds . . . this weight is extremely accurate since each load is being weighed, according to Arizona state regulations, by a state representative on a truck-type platform scale.

Borrow sprinkled 7 days

The unusual techniques were developed to speed dirtmoving and to more easily meet strict compaction specs. For

On this job, all loads are being scale-weighed. Records show faster, easier-loading Michigans are moving 20% more paydirt per day than similar-sized pans formerly used. Owner Sundt (left) also likes Michigan "design simplicity, ease of operator training," plus "best service I've ever seen, both from factory and dealer." Distributor is Western Machinery Co., Phoenix.



600 hp Michigan Dozer heaps 29 yd Michigan Scraper in 35 seconds.

Success with Michigan increase production 20%

example, before digging starts, the dry, sun-baked borrow area is laced with perforated pipe. Water sprinkles out night and day for about a week. Once the soil is saturated seven to nine feet deep, Sundt turns off the water, removes the pipe, brings in his earthmoving machines. Pre-wetting, say men on the job—a 5.3 mile, \$1,031,000 section of Tucson-Benson Interstate Highway—makes for easier loading. It also has eliminated the clutter of water wagons and motor graders and extra sheepfoot rollers which previously kept scrapers waiting in line to unload.

Success with Michigan Tractor Shovels prompts purchase of Scrapers, Dozer

Both the Michigan Scrapers and Michigan Dozer arrived on this job in mid-contract. "It wasn't that we were doing badly with our existing scraper-pusher fleet," explains Don Kellogg, Sundt's equipment supt., "it's just that we thought we could do better. We had excellent experience with Michigan Tractor Shovels, and so, because they have the same power train design, expected the same results with Michigan Scrapers and Dozers. We got 'em too. Moving 119,500 yds roadway excavation, 644,100 tons of borrow, 242,400 tons select and 49,000 tons aggregate base, we should finish 30 days ahead of schedule, without changing our work day!"

Higher scraper production is one reason, of course. Less downtime is another. "And good visibility," Ferris Ray, project manager, points out, "has reduced waste time. Scraper and Dozer operators can always see each other. No one has to blow horns or ring bells or stand up. Just a few simple hand signals coordinates all work."

Load at 7½ mph

"Scrapers load the 2800 lb/yd silty caliche mixture in second gear (7½ mph). They power-shift instantly to third (15 mph) as they're shoved off . . . move to and from the fill at speeds up to 30 mph . . . positively eject all loads." The result is 50 two-mile cycles per Scraper per 8-hour shift . . . 8,750 tons total . . . 20% more paydirt than previously moved by same size fleet of another make.

"The Monster"

The Michigan Model 480 Tractor Dozer is proving a remarkable pusher. The men have dubbed it The Monster. "It sure has power!" says Clay Smith, operator. "It loads these big Scrapers fast (usually in second gear 7½ mph) . . . backs up fast . . . goes from one borrow area to another fast (15 to 28 mph).

"In fact," continues Smith, "there isn't much this Dozer can't do fast. I've trimmed on 2-on-1 slopes and push-

loaded on a 2-to-1 slope. I'll admit I wasn't too happy when I was told I had to run the Model 480. I'd been a crawler man for years. But I sure changed my mind! The power-steered, power-shifted 480 is much easier to run—in fact, when I climb down off the machine at the end of a day, I'm still rarin' to go."

Built-in scarifier

Where borrow is tight and tough, an optional Model 480 attachment, blade-mounted scarifier teeth boost production. When dozing or pushing forward, these teeth fold up, out of the way. But on return operator drops blade, teeth jut out and rip 8 inches deep . . . just right for the next scraper pass.

Michigan units like these are helping dirtmovers all over the country boost production. Three Scraper models—10½, 19, 29 yds—four Dozers—162, 262, 375, 600 hp—are now available. Your Michigan Distributor will be glad to show them to you.

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CLARK EQUIPMENT COMPANY
Construction Machinery Division

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In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

Michigan Dozer operator has excellent view of blade.



High-speed Michigan Dozer expands

Nevada firm reduces handling costs 25%

Nacon Company, Inc is a Las Vegas firm that *doesn't* take chances when buying equipment. "Gambling belongs in the casinos!" says Tom Stewart, president of Nacon. "Before we lay out \$50,000 or so for any big dozer, we *demand* on-the-job demonstrations.

"Our latest demonstration really proved profitable. In the hopes of boosting crusher-feed production, we tried a rubber-tired Michigan Dozer. The output of this rig really surprised us. Tests showed the 375 hp Model 380 could push enough material to our crusher to produce 400 tons of spec stone per hour—even at distances up to 400 feet. No competitively-priced rig came close to this production. We talked it over with our Michigan Distributor, Graig Equipment Company . . . and bought!"

The Michigan's first job was on a 9-mile excavating-grading-structures section of new four-lane blacktop Federal Interstate Highway near Las Vegas. Here, Nacon's contract called for several hundred thousand tons of roadway base and sub-base gravel (3,250 lb/yd) in three grades—select bankrun, #1 and #2 stone. Michigan's share was to dig out and push all this material to the crusher. It did . . . at an average work speed of 3 to 7 mph!

Production up 20 to 30%

Output averaged 400 tons per hour . . . 20 to 30% higher than Nacon's estimates with other machines . . . at a per-ton cost "about 25% lower." And since the high-speed Michigan could economically work longer distances, Nacon didn't have to move the crusher as often as with crawler-feeding. One set-up handles as much as 315,000 tons.

Bud Jacobsen, operator of the Model 380, likes the Michigan for more reasons than high production. "For one thing, it's easier riding," says Bud. "Tires absorb bumps and ruts so you can work faster on rough going. Second, you sit higher . . . have a better view of blade and of ledge and hopper edges. Third, Michigan handles easier . . . you change speeds and direction simply by moving little hydraulic levers and without foot-clutching. Its ease of handling, plus greater speed, adds up to greater production than any crawler at any distance over 50 ft!"

Michigan Tractor Shovel loads 20 yd trucks in 2½ minutes

But the Model 380 Dozer isn't the only Michigan drawing praise around Nacon's crushing set-up. A 2½ yd Model 175A Tractor Shovel is attracting attention as

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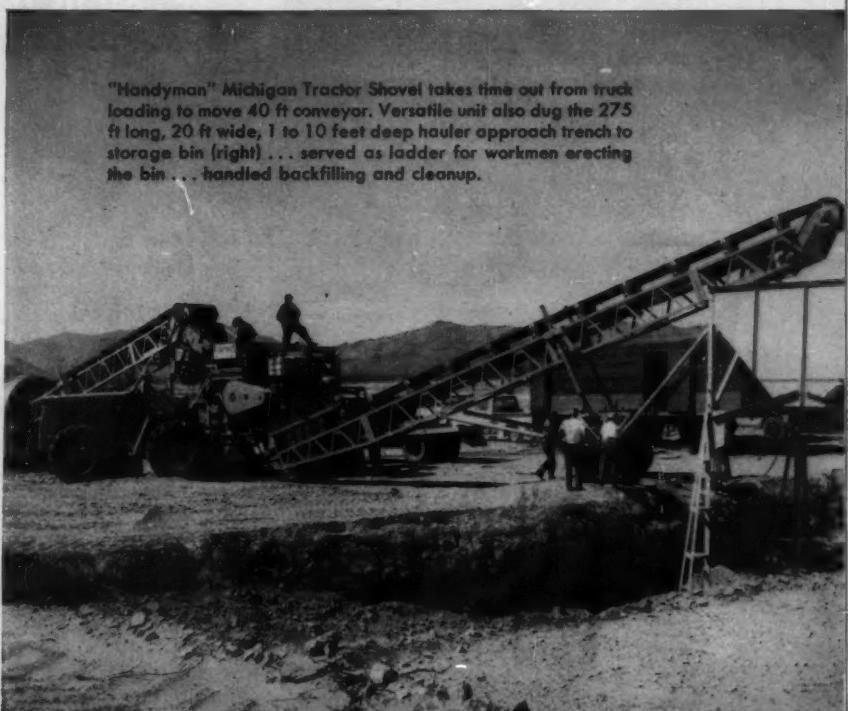
CL
EQU



practical crusher feed distance to 400'

it handles stockpile loading. This unit heaps a typical 20 ton truck in only 5 passes, 2½ minutes . . . a typical 20 ton bottom-dump hauler in 4 passes, 2 minutes.

Output like this, day in and day out, speaks well of Nacon's job planning . . . also proves Michiganders have what it takes to speed dozing and loading. See for yourself! Pick the rubber-tired Michigan Dozer you want to see, 162, 262, 375, or 600 hp . . . or the Michigan Tractor Shovel, 16 cubic feet to 6 cubic yards (standard SAE-rated capacity) . . . then ask your Michigan Distributor for a demonstration.



"Handyman" Michigan Tractor Shovel takes time out from truck loading to move 40 ft conveyor. Versatile unit also dug the 275 ft long, 20 ft wide, 1 to 10 feet deep hauler approach trench to storage bin (right) . . . served as ladder for workmen erecting the bin . . . handled backfilling and cleanup.

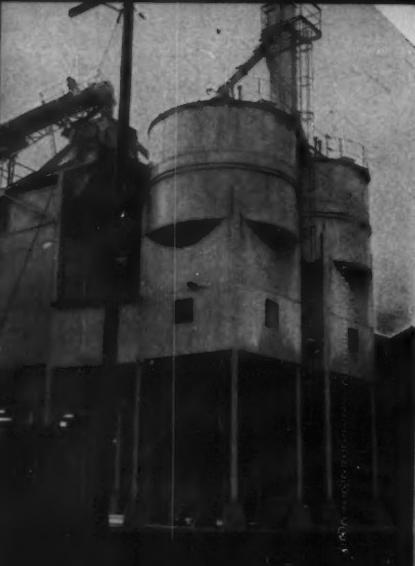
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Twin 1000-barrel Heltzel Cement Plants are partitioned into four compartments to handle up to four types of cement and fly ash. All compartments are loaded by a common elevator.

HELTZEL

By teaming two standard Heltzel batching plants Marion Ready Mix, a leading Pittsburgh concrete supplier, is able to get the high speed production they require during rush periods. Utilizing dual two-stop drive-throughs, four trucks can be handled simultaneously and different mixes can be batched at the same time by a single batch crew.

Aside from the production advantages Marion is able to handle both plants with a single material handling system. One belt conveyor services all eight compartments of the two 400-ton aggregate plants through an eight-position rotary spout. The four compartments of the two 1000-barrel cement plants are fed by a single elevator through an ingenious system of flop gates. All batchers are controlled from one platform.

The results: Marion charged 30 trucks with aggregate and cement in 35 minutes. A six-yard, 19,000 lbs. aggregate batch was cycled in 45 seconds and a six-yard cement batch in 55 seconds. This from standard manual controls.

If you're not now getting this kind of plant performance why not contact your Heltzel representative for the last word in modern batching technique. Write today for complete information.

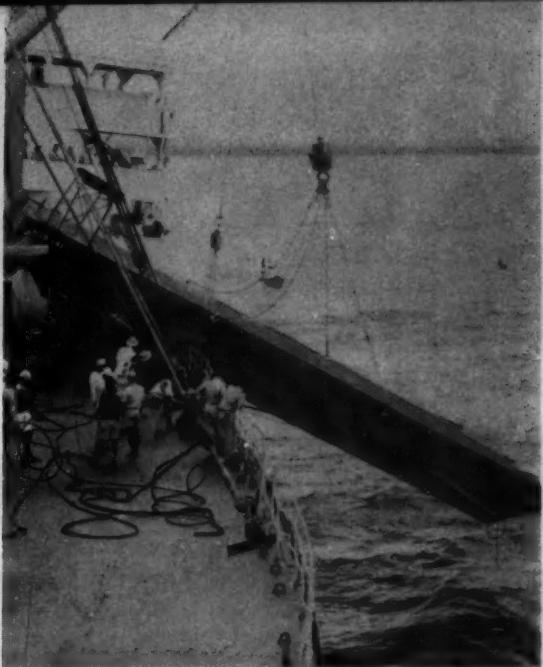
THE HELTZEL STEEL FORM AND IRON COMPANY

WARREN, OHIO

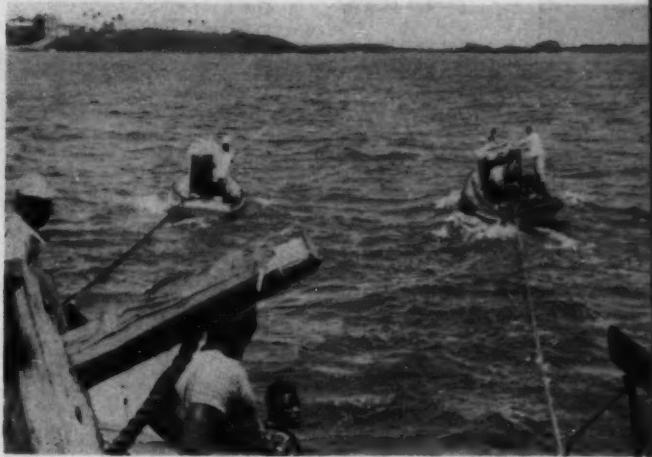


twin two-stop
manual plant gives
ready-mix producer
speed, flexibility





AMPHIBIOUS LANDING—Ship's crane lowers steel barge over the side, then loads it with 100 tons of construction machinery. Two tugs tow the barge to shore and push it up on the beach. This was the only way to land equipment for a job on the African coast.



Earthmovers Hit the Beach

ONE OF THE TOUGHEST jobs Raymond International had to tackle in building a harbor at Cape Palmas, Liberia, was to find a way to get equipment to the remote West African coast site.

No roads or railroads lead to the area. The Cape's main supply line consists only of a small fleet of 10-oar row boats that ferry material three miles from ships to shore.

To move their machines from a freighter to the beach, Raymond had to organize an amphibious landing. It was a tricky business, but good planning carried it off without mishap.

First, Raymond had to find the safest, most practical type of landing craft for such an operation. Next, they had to determine how much of the construction equipment would have to be disassembled. They also had to find a way to unload large pieces of equipment from the ship, load them onto a landing craft, then haul them to shore on waters made hazardous by sand bars. Finally, they had to unload the landing craft on the beach.

Raymond's construction managers decided that self-propelled landing craft might not be reliable enough in the surf. They decided, instead, on a 30x100-ft steel barge 7 ft deep with a capacity of 100 tons. Hauled and guided by two small tugs, a barge figured to be easier to control while offering maximum safety to men and equipment.

Tugs and the barge were brought in aboard the freighter along with the construction equipment. When the freighter anchored offshore, the barge was lowered over the side by the ship's booms, then tied alongside. The tugs next were sent over the side.

First item loaded on the barge was a set of timber mats. These were followed by a Caterpillar Traxcavator, the 50-ton turntable and crawlers of a Northwest 80-D shovel, and a boom. These items completed the barge loading, and the first haul to shore began.

Raymond elected to establish its beachhead inside the sheltered mouth of the Cavally River at Cape Palmas. A major problem

there was timing the landing at peak high tide so that the barge would clear a high sand bar.

As the barge neared shore, the tugs moved around in back and pushed it onto a very short stretch of beach—the only available landing area. Mats then were positioned off the bow to serve as a temporary ramp on which the Traxcavator could disembark onto the beach. As soon as the Traxcavator moved off, it pushed up a sand ramp to the barge's bow so that the Northwest could move into the beach. There it quickly was fitted with a crane boom for unloading successive barge-loads of equipment and materials.

It took seven additional landings to bring all equipment ashore. Rigs landed included a Caterpillar D7, four Koehring Dumptors, four trucks, two Chicago-Pneumatic compressors, one concrete mixer, and a variety of accessory tools.

The machinery now is at work in the construction of a pier, breakwater, and causeway that will make a harbor for Cape Palmas and eliminate the need for future amphibious landings.



30 Yd. BOTTOM-DUMPS

Loaded by big draglines or overhead hopper, a fleet of ten Bottom-Dump "Eucs" haul pervious gravel from borrow areas up to 2 miles from the dam. They will move well over 12 million yds. on these long hauls with maximum grades of 8%.

22-Ton REAR-DUMPS

Fourteen "Euc" Rear-Dumps are being used to haul earth and rock from the channel, diversion tunnel and structure excavations. These versatile haulers have been "standard" equipment on practically every major dam built in the past 20 years.

38 "Eucs" maintaining

26 million yd.

NAVAJO DAM in northwestern New Mexico will be the second largest ever built for the U. S. Bureau of Reclamation and one of the highest earth-fill dams in America. It will take nearly 5 years to build and will require 26 million yds. of compacted fill for the embankment that will rise a maximum of 405 feet. The resulting storage reservoir 34 miles long will provide irrigation water for 115,000 arid acres on the Navajo Indian Reservation.

Morrison-Knudsen Company, Inc., sponsor of the joint venture with Henry J. Kaiser Co. and F & S Contracting Co., already has 38 "Eucs" at

work on this big, tough job. This Euclid fleet includes 10 big "Twin" Scrapers, TC-12 Twin-Power Crawlers, 30 yd. Bottom-Dumps and Rear-Dumps of 22 ton payload capacity. M-K's choice of Euclid equipment to move this tremendous tonnage of compacted fill material was based on years of experience with the dependable, high productive capacity of "Eucs" on a wide range of jobs.

Whether you're using earthmoving equipment on big projects like Navajo or small grading work, there are Euclid models to fit the job.

EUCLID Division of General Motors, Cleveland 17, Ohio
EUCLID (GREAT BRITAIN) LTD., Lanarkshire, Scotland





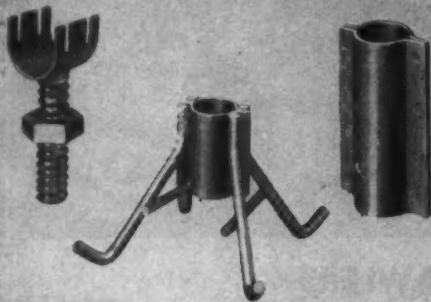
"TWIN" SCRAPERS and CRAWLERS

Ten of these big twin-power scrapers of nearly 600 total h.p. are moving 30 yd. loads of impervious core material to the fill. They are push loaded in the borrow pit by Euclid TC-12 Tractors of 425 net h.p. to get maximum loads in the shortest possible time. Four TC-12's were

purchased to push load the "Twin" Scrapers. With two engines and independent track drive, these "Euc" tractors have exceptional maneuverability with power and speed that give them unequalled work-ability on all big tractor jobs.

High Production at NAVAJO DAM

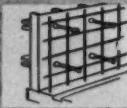
See your Euclid dealer for information on
the complete line of "Euc" Scrapers, Crawler Tractors, Rear-Dump and
Bottom-Dump Haulers . . . he can show you that
Euclids give greater return on investment.



**HEAVY-DUTY
SCREED
SUPPORTS**

Overpasses and
Underpasses

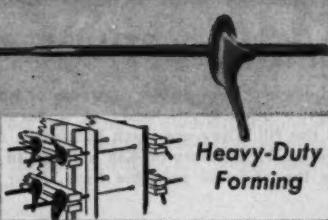
THREADED COIL TIES



Engineering
Structures



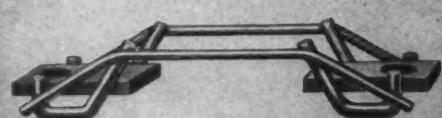
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**4-STRUT
COIL ROD
ANCHORS**



**PLATE
HANGER
FRAMES**



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**One Source For All Accessories
For Dependable Concrete Forming**

These are examples of the numerous types of form ties, anchors, inserts, and other items in Superior's most complete line of concrete accessories. The illustrations show the variety of concrete form work and related jobs in which Superior accessories are used. All items are designed to provide the most dependable and efficient forming methods.

WHENEVER YOU ARE PLANNING FORM WORK... Superior's technical assistance is available to prepare suggested layouts. Call or write to nearest address shown below.

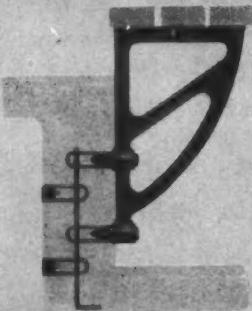
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Houston Office
4101 San Jacinto
Houston 4, Texas

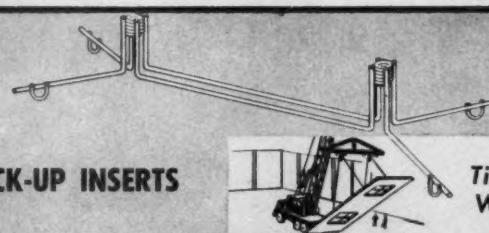
Pacific Coast Plant
2100 Williams St.
San Leandro, Calif.



**RISER-
FRAMES**



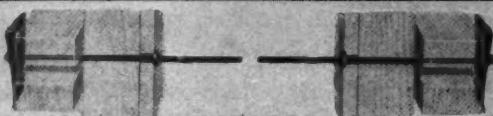
Stadiums
and
Grandstands



PICK-UP INSERTS



Tilt-Up
Work

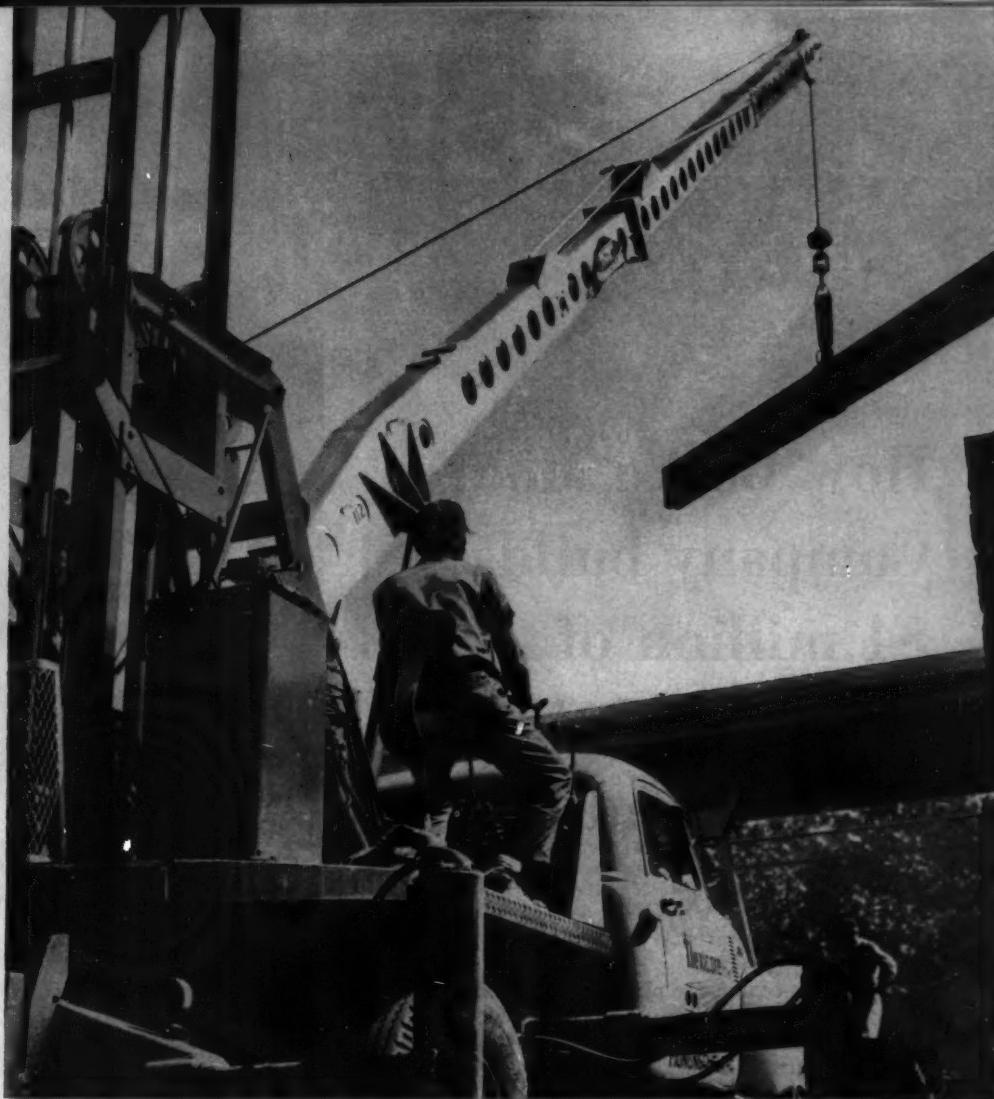


SNAP TIES



Ordinary
Foundations

USS TRI-TEN and "T-1"
Steels are used in the boom
and other parts of the
Bucyrus-Erie Hydrocrane for
greater strength, light weight,
and toughness.



Compact Hydrocrane Lifts 12 Tons!

Built with  **TRI-TEN Steel**

This compact Hydrocrane has a "boarding-house" reach of 50 feet—and can double as a $\frac{1}{2}$ -yard excavator. It speeds to the job at 50 mph and sets up for action in 5 minutes.

Never before has a crane with such power and reach been designed so light and strong. The boom, A-frame, hoist standards and jib extensions are made of USS TRI-TEN High-Strength Low-Alloy Steel. Outrigger boxes are made of USS "T-1" Steel. In fact, the light-weight design of the crane is possible because of these extra strong steels.

Major Advantages of USS TRI-TEN Steel

High-Strength—Has minimum yield point of 50,000 psi.

Toughness—An outstanding characteristic of this steel.

Weldability—Excellent for all the usual processes except spot and seam welding.

Abrasion Resistance—Good . . . can be used for equipment requiring both high-strength and abrasion resistance.

Atmospheric Corrosion Resistance—Good . . . two times that of carbon steel. Other USS High-Strength Steels with minimum yield points of 50,000 psi include USS MAN-TEN Steel, which offers strength with abrasion resistance plus economy and USS COR-TEN Steel for

strength with superior atmospheric corrosion resistance. Where very high strength is needed, USS "T-1" Constructional Alloy Steel, with a minimum yield strength of 100,000 psi, assures maximum load carrying ability combined with weldability and high resistance to impact abrasion.

Write for our booklets describing these steels that do more. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania—or contact our nearest sales office.

USS, TRI-TEN, MAN-TEN, COR-TEN, and "T-1" are registered trademarks

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Ala.
United States Steel Supply—Steel Service Centers
United States Steel Export Company



United States Steel

How Berke Moore Company builds \$4 million of America's bridges, tunnels, and dams in a year

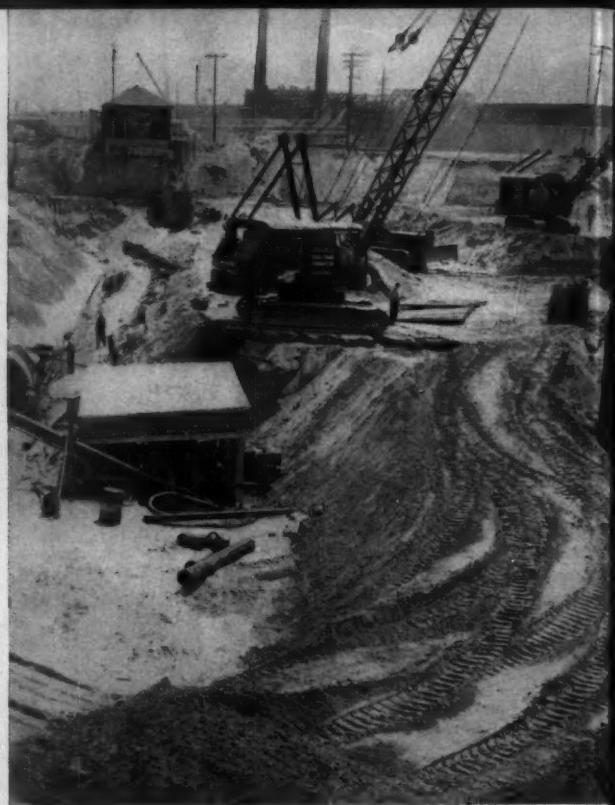
Contractors continue to play the lead role in the construction industry's growth. There are 3559 million-dollar and over contractors, who account for 83% of the total contracts awarded to firms doing \$100,000 and over in 1958.

One contractor among the million dollar group is Berke Moore Company, Inc. of Boston, Massachusetts. This contracting firm was founded in 1941 by Steven R. Berke and Raymond L. Moore for the purpose of general contracting and construction engineering. Prior to founding their own company, these men had long and successful experience on the construction of bridges, buildings, roads, dams, tunnels and other construction projects. Mr. Berke and Mr. Moore worked for one of New England's largest construction firms as chief engineer and superintendent respectively.

The long and proven experience of these men has accounted for their firm's growth and success since its founding. Although Berke Moore Co. has engaged in a wide variety of construction, in recent years it has concentrated on bridges, tunnels, underpasses, foundation and dam work. Most of this work is performed in New England, but primarily in Massachusetts and Connecticut.

\$20 million of construction in 5 years

One measure of the success of this contracting firm is the volume of work it has attained over a period of years. Contractor Berke Moore has completed approximately \$20 million of construction over a five year period . . . an average of \$4 million a year.



Sewage Treatment Head Works — located at Chelsea, Mass. \$2.7 million contract required 90,000 yds of excavation, 15,000 yds of concrete, 1,000 of reinforcing steel.

The nucleus of the Berke Moore contracting operation consists of a permanent staff of 25 key men. These key men are backed up by a force of up to 150 men when the firm is at the height of construction operations.

Berke Moore tackles unusual, tough jobs

While many contracting firms are reluctant to contract for the unusual or especially tough construction projects, Berke Moore pride themselves on taking these projects. Consequently, this contractor has developed many new and improved methods of construction in bridge, dam, foundation and tunnel work. Berke Moore's willingness to tackle the tough projects has been a contributing factor in their success over the years.

Employs variety of equipment

How much and what kind of equipment does a \$4 million a year builder of bridges, dams and tunnels and foundations need? According to Mr. Berke, President, their operation requires the use of some one hundred units of major equipment. The total estimated value of this equipment is \$750,000.

This contractor, like most contractors who keep equipment operating as regularly as possible, must keep investing in new and better machinery for replacement purposes in order to bid successfully on new jobs. In 1957, Berke Moore invested \$100,000 for new machinery and in 1958, \$200,000.

Here is a breakdown of this contractor's major units of equipment.

2 truck cranes — (Lorain)
 5 crawler cranes — (Manitowoc)
 2 shovel and crane — (Lima)
 2 graders — (Austin-Western, Caterpillar)
 2 Gradalls
 1 roller — (Galion)
 4 dozers — (International)
 1 pile hammer — (McKiernan-Terry)
 4 dump trucks — (International Harvester)
 1 boiler, 60 hp
 3 lighting plants — (Kohler)
 7 pickup trucks — (Ford, International, GMC)
 6 compressors — (Jaeger)
 15 pumps — (Jaeger, Gorman-Rupp)
 1 front end loader — (International Drot)
 4 welders — (Hobart)
 10 vibrators — (Homelite)
 30 miscellaneous units of equipment



Steven R. Berke (left) and Raymond L. Moore, founders and partners of Berke Moore Construction Company, Inc.

Both are long-time readers of CONSTRUCTION METHODS Magazine.

Mr. Berke says:

"I think CONSTRUCTION METHODS is an excellent magazine. I've been reading it for over 30 years. It provides good coverage of important jobs which have given us helpful ideas and techniques. We've applied these in our work through the years. I also think the advertising shows lot of good techniques, and new equipment, and I make a practice of reading it."

50% of Gross Invested in Materials

Contractors who do heavy construction work of the type which Berke Moore tackles have a significant investment in materials. This contractor invests an average of 50% of his gross construction contracts in materials such as steel, concrete, lumber, steel sheeting, steel piles, etc. According to Mr. Berke, the success of a project in terms of profit that is made weighs heavily on the purchase of materials as well as the efficient use of equipment.

Here's what Mr. Berke, President, says about purchasing at Berke Moore:

"Because of the large investments which Berke Moore makes annually in construction machinery and materials, we must get the opinions and recommendations of our key men. These include superintendents, project managers, and equipment operators. It's our practice to talk to these men to find out their experience and recommendations on different equipment and materials . . . and to see if there is agreement with the opinions of myself and Mr. Moore. The men who use equipment should know it best. This system helps us to make smarter buying decisions."

Berke Moore, like other successful contractors who invest significant amounts of money each year for equipment and material have key men who exert some influence on purchases. It's for this reason that key men in construction look to the editorial and advertising pages of CONSTRUCTION METHODS Magazine for information on new and better equipment, materials and techniques.

Important men in construction subscribe to CONSTRUCTION METHODS

In addition to Mr. Berke and Moore, there are 6 key men in this important contracting firm who subscribe to CONSTRUCTION METHODS Magazine.

If you want to reach these key men in the nation's top contracting firms like Berke Moore Company of Boston, consistent advertising in CONSTRUCTION METHODS is your most direct route.



Central Artery of Fitzgerald Expressway. \$6½ million bridge project requiring 5,000 tons of steel, 21,000 yds of concrete, reinforcing steel — 1300 tons, and 60,000 feet of steel h-piling.

**Construction
Methods** AND EQUIPMENT

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GUTS!



STANDARD

Model **R-M**

ASPHALT PLANTS

manufactured in 2000, 3000, 4000, 5000, or 6000 pound batch capacities. The Standard Plant is tailored to fit your requirements. Plant layouts may be semi-portable or portable.

...WITH POWER TO SPARE

STANDARD Plants have ability to "take it"

The rugged, massive Standard R-M Asphalt Plant packs more power, with extra capacity, over-sized vibrating screens, elevators, and dryers; larger bearings, heavier shafts and giant sized hi-speed pugmill. This gives you the toughest and most economical asphalt plant in the world.

STANDARD

..built to do a better job!

Model **R-M**

ASPHALT PLANTS



Simplex exclusive push-button operation saves man-hours—delivers the maximum hourly tonnage of specific bituminous mix day-in-day-out.

STANDARD STEEL CORPORATION

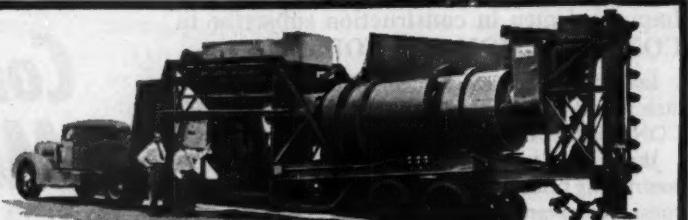
General Offices & Plant, 5089 Boyle Avenue, Los Angeles 58, California

Midwest Offices & Plant LEADER IRON WORKS Decatur 89, Illinois

(Division of Standard Steel Corporation)

Attention Contractors!

The New STANDARD Portable T. M. Plant offers top production. A complete self-contained batch type Asphalt Plant...on wheels. One man operates! Has exclusive "SELF-LIFT" erecting device. RUGGED - ECONOMICAL - SIMPLE. Mixes up to 60 to 80 tons per hour!



PARTS WAREHOUSES IN LOS ANGELES AND DECATUR, ILLINOIS

Construction Men in the News...

Kaiser

JOHN H. TACKE will be resident manager for Kaiser Engineers on construction of the Atomic Energy Commission's \$145-million graphite moderated plutonium production reactor at the Hanford Works, Richland, Wash.

Tacke managed an earlier reactor Kaiser completed for the AEC Hanford in 1954. Most recently he headed construction of the Snowy Mountains Hydroelectric Scheme in Australia. This is a joint venture project the company is sponsoring in Australia and stands as the largest civil contract ever awarded by the Australian government.

Tacke started his construction career with Kaiser during that firm's work on Boulder Dam. From there he went to Grand Coulee Dam. During World War II, he supervised the construction of Liberty and Victory ships built by Kaiser at its Oregon shipyards.

Other top men on the Hanford project will be Hugh Fulton, assistant resident manager; George L. Roberts, construction engineer; and Park N. Savage, general superintendent.

Corps of Engineers



COL. HARRY O. FISCHER is the new Division Engineer of the North Central Division, Army Corps of Engineers. He succeeds Major Gen. Louis J. Rumaggi who retires after 37 years of active service. Col. Fischer will direct the engineering and construction of military and water resource projects under the Corps of Engineers in a 12-state area sur-

rounding the Great Lakes.

At the outbreak of World War II, Col. Fischer commanded engineer troops in the Philippine Islands. He was taken prisoner when the islands fell and spent two years in Japanese prison camps. He was among the many hundreds of prisoners who were aboard an unmarked Japanese prison ship en route to Japan when the islands were freed.

Raymond



EUGENE F. GIBBONS will manage the newly formed Marine Division of Raymond International, Inc. The division will specialize in waterfront construction in New York harbor.

Before joining Raymond, Gibbons was chief engineer of the New York State Department of Public Works. He served earlier with several large contractors on heavy waterfront construction. He is a trustee of The Moles, an association of construction men.

M Y and N

DALLAS (PETE) YOUNG, veteran of 45 years in contracting, has announced that he will retire "gradually" from McDonald, Young & Nelson, Inc., a northern California contracting firm in which he is a partner.

Coakley & Booth

ROBERT J. ARMSTRONG is the new vice president of Coakley & Booth, Inc., New York foundation specialists.

Armstrong joined the firm as chief engineer in 1956. Before that he had been associated with

Drilled-In-Caisson Corp., Spencer, White & Prentis, and the Frederic Snare Corp.

Dravo



WILLIAM A. ROBINSON is the new assistant general manager and chief engineer of the Contracting Division, Dravo Corp., Pittsburgh.

Robinson joined Dravo in 1934 as a field engineer and has since served in many engineering and supervisory posts for the company. He is a member of the Committee of Navigation and Flood Control Facilities of the American Society of Civil Engineers and a member of the Engineers Society of Western Pennsylvania as well as the Society of American Military Engineers.

Parsons



MILTON C. ROTE is a new vice president of the Ralph M. Parsons Co., engineers and constructors, Los Angeles. He is manager of the construction division with responsibility for projects throughout the United States and abroad.

Why your dollar buys more

with **FORM-CRETE**

STEEL FORMS

YOU GET—EVERY FORM YOU NEED FROM ONE DEPENDABLE SOURCE

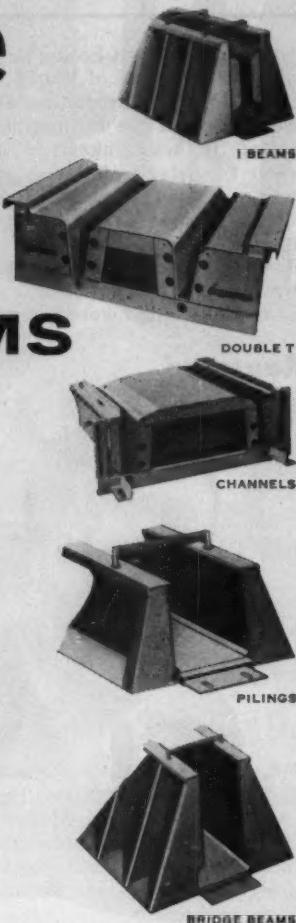
The Form-Crete line basic forms represent the most versatile group of steel forms ever produced for casting prestressed and precast concrete products. Each form has been carefully designed to insure a uniform, smooth product with every pour. Heavy-gauge steel construction means longer form life. What's more, many Form-Crete forms can be quickly adapted to produce a variety of finished products. And where special needs call for custom forms, FMC has the know-how and facilities to turn them out quickly and efficiently.

YOU GET—FAST, ON-TIME DELIVERY

Two modern plants, Lakeland, Florida in the east and Riverside, California in the west, have full facilities to turn out the forms you require when you need them. Shipments can be scheduled to meet your requirements. Call on Form-Crete, rely on Form-Crete for the finest in all-steel forms all the time.

YOU GET—EXPERIENCED ENGINEERING ASSISTANCE—FREE

Long known as the pioneer manufacturer of all-steel forms, Form-Crete engineers have years of valuable experience to offer you. This free engineering service is made without cost or obligation. Oftimes a standard form can be modified to meet your needs. And if a custom unit is required, Form-Crete engineers have the know-how to produce it for you in the shortest time.



NEW! FROM FORM-CRETE! SINGLE T SLAB FORM



The latest in design, this new Single T permits castings with slabs six or eight-feet in width. Special design feature permits form to be swung back slightly, allowing easy removal of product. Write for more information.



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Please send me information on the new Single T Form

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City _____ Zone _____ State _____

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributor Appointments

Koehring Co.: Three Koehring divisions have appointed new distributors. Buffalo - Springfield Roller Co. has named Allied Construction Equipment Co. of St. Louis, Mo., Parker-Danner Co. of Hyde Park, Mass., and W. I. Clark Co. of Hamden, Conn. The Kwik-Mix Division has named Andrews and Andrews Equipment Co. of Portland, Ore., and Bradley and Edwards, Inc., of New Hyde Park, N. Y. The Koehring Division has appointed the Wood Tractor Co. of Portland, Ore., as Oregon-Washington distributor.

Worthington Corp.: The following four distributors have been appointed: Mid-Mountain Machinery Co. of Spokane, Wash.; Amick Equipment Co., Inc., of Coyce, S. C.; Buckeye State Machinery Inc., of Toledo, Ohio; and Lewis & Coulter, Inc. of Pittsburgh, Pa.

Highway Equipment Co.: The following four distributors have been appointed: Lowry Equipment Co. of Redding, Calif.; Paving Supply & Equipment Co. of Washington, D.C.; Ingram-Houston, Inc., of Houston, Tex.; and NorMont Equipment Co. of Great Falls, Mont.

Hercules Motors Corp.: Ed Jacobs Motors of Whitehorse, Yukon, has been named the first Hercules master distributor in Canada's Yukon Territory. The new distributor is strategically located on the Alcan Highway and has facilities for servicing trucks making the Alcan run.

Radio Corporation of America: The following manufacturer's representatives have been named for RCA mobile radio equipment: Spiteri's Electronics of Erie, Pa.; Radio Communications Service of Evansville, Ind.; Frosch Theatre Supply, Inc., of Minneapolis, Minn.; Communications Sales,

After this modern hospital was completed in 1954, the Children's Clinic was added to the right wing in 1958. Lehigh Mortar Cement helped both contractors produce top quality masonry work.



"WORKABILITY—UNIFORMITY" with Lehigh Mortar Cement

Lehigh Mortar Cement was used throughout this new Baptist Memorial Hospital in Jacksonville, Florida, including the Wolfson Children's Clinic addition (3rd and 4th stories of wing in right foreground).

Mr. Henry DuPree explains his firm's preference for Lehigh Mortar Cement: "We are well pleased with its sand carrying capacity and workability. It gives us a very uniform mortar and, thereby, a saving on labor cost."

Try Lehigh Mortar Cement on your next job and discover its advantages for yourself.

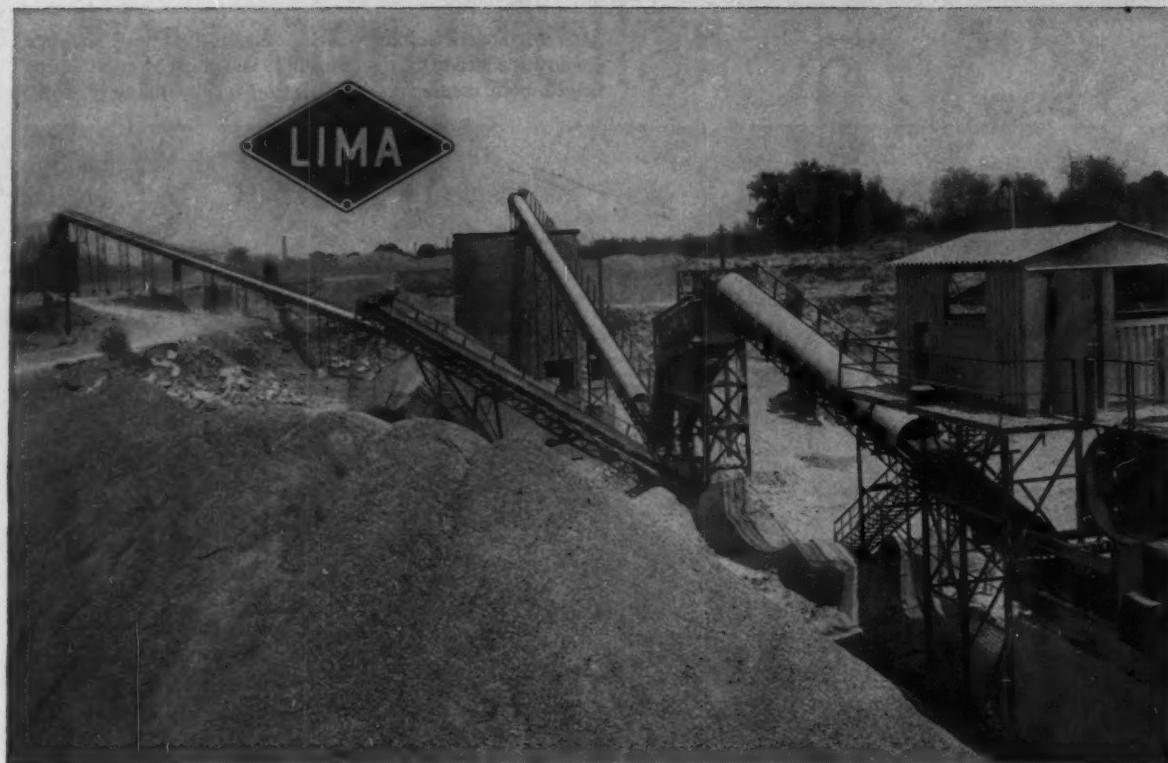
Prime Contractor:
The Henry G. DuPree Company, Jacksonville, Fla.
Contractor For Wolfson Children's Clinic Addition:
Ruscon Construction Co., Charleston, S.C.

Architects:
Reynolds, Smith and Hills, Jacksonville, Fla.

LEHIGH PORTLAND CEMENT CO.

Allentown, Pa.

• LEHIGH MORTAR CEMENT • LEHIGH AIR-ENTRAINING CEMENT • LEHIGH PORTLAND CEMENT • LEHIGH EARLY STRENGTH CEMENT



Stationary Lima A-W installation, equipped with 32 x 40 in. primary jaw crusher, produces materials to 10 specifications. Conveyor covers help hold down dust, prevent materials from falling.

Lima Austin-Westerns CRUSH MORE FOR LESS!

"You simply cannot buy better crushing equipment than that made by Lima Austin-Western. It's tops—ruggedly built of high-quality materials; engineered to economically produce high tonnage hour after hour without lost production time or costly breakdowns. In our experience, maintenance costs and requirements on Lima A-W equipment are extremely low; distributor service excellent." That's what Craig Fenton, president of the Northwood Stone & Asphalt Co., Belle Center, Ohio, says about his company's stationary Lima A-W installation.

Lima Austin-Western offers a complete line of portable and stationary crushing and screening plants. Designed and quality built to set new standards of high-volume production of accurately sized gravel or rock



Lima Austin-Western portable 101-SE crushing and screening plant with mechanical feeder is served by 1-yd. Type 44 Lima shovel.

over long years of trouble-free service.

The Lima A-W line includes many sizes of jaw and roll crushers, matching screens, elevators, conveyors and bins. Apron or reciprocating feeders control material flow, eliminate over-loading, choking and surging. Centralized power plants, anti-friction

bearings, and fewer shafts, belts and gears help keep operating costs low. Learn how you can increase your pit or quarry production and at the same time reduce tonnage costs! See your nearest distributor or write us today: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment
BALDWIN · LIMA · HAMILTON
 CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO



SALES AND SERVICE . . .

continued

Inc., of Youngstown, Ohio; and Electronics Specialty Co. of Charleston, West Va.

Yale & Towne Mfg. Co.: The following four distributors have been appointed: The G. C. Phillips Tractor Co., Inc., of Birmingham, Ala.; The Malette Construction Equipment Co., of Sault Ste. Marie, Mich.; George C. Gilbert, Inc., of Kingston, N. J.; and The Diamond-Colloton Equipment Co. of Milwaukee, Wis.

On the Sales Front

Chain Belt Co.: Robert V. Krikorian has been appointed to the newly-created position of manager-construction machinery section and Charles A. Christy has been named sales manager of the section.

Curtiss-Wright Corp.: John P. Sheehan has been appointed as the New England District Sales Manager of the Curtiss-Wright Corporation, South Bend Division, Construction Machinery.

McCulloch Corp.: Charles D. Allis has been promoted from general sales manager to vice-president in charge of sales.

International Harvester Co.: The Construction Equipment Division has appointed five new territory sales representatives. They are: John A. Salter, Syracuse, N. Y.; Howard J. Barrand, Dallas, Tex.; George M. Bookman, Charlotte, N. C.; James M. King, Oklahoma City, Okla.; and Russell H. Whitting, New York City.

Wagner Electric Corp.: The Automotive Division has appointed John A. Gibbs as manager of the automotive branch office at Baltimore and J. P. Miller as manager of the Cincinnati office. At Baltimore, Gibbs succeeds John Moyer.

Gar Wood Industries, Inc.: Del Hetrick has been appointed tractor equipment sales manager. He will direct sales development and management activities for Gar Wood's new line of crawler tractor equipment from the Findlay, Ohio, plant.

Quick-Way Truck Shovel Co.: R. G. Herbst has been appointed general sales manager of the company. He replaces T. S. Petersen who has resigned.

Here's why you get



our PAYLOADER gets a final test on a special chassis dynamometer, before shipment

MORE in a PAYLOADER®

1. **Distributor Experience:** The oldest, largest, most experienced and best equipped organization in the rubber-tired tractor-shovel field sells and services the 'PAYLOADER' line.
2. **Design Experience:** Almost every "FIRST" in both two and four-wheel-drive rubber-tired tractor-shovels is the result of HOUGH pioneering.
3. **Application Experience:** There have been more 'PAYLOADER' integrated rubber-tired tractor-shovels built and in use than all other makes combined.
4. **Quality:** HOUGH builds only the best with the highest standards for all materials, processing, components and finished machines. Every unit is tested on special chassis DYNAMOMETER.
5. **Safety:** Boom arm design and position on all four-wheel-drive 'PAYLOADER' models keeps all moving members away from the operator's area.
6. **Stability:** Exclusive "balanced-design" reduces "dead-weight", gives more productive horsepower-to-weight ratio and reduces material spillage.
7. **Easy Operation:** Power brakes, power-steering and power-shift transmissions, standard on most models, plus torque-converter drive make HOUGH machines easy to operate, reducing fatigue.
8. **Premium Materials:** HOUGH has inaugurated the use of high-strength, light-weight steel like USS "T-1" giving added strength with less weight in boom arms.
9. **Extra Wear:** Hydraulic piston rods of heat-treated forged steel with more than twice the chrome plating of most units. Cylinders are tested at pressures in excess of maximum loads.
10. **Economy:** Lower costs of operation, less down-time, less depreciation and better distributor facilities make 'PAYLOADER' tractor-shovels a MORE PROFITABLE investment for your money.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

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MODEL HD-1 FAILING HORIZONTAL DRILL



for drilling "weep holes"

to relieve water pressure in landslide areas...

blast holes, coring, soil testing...

You'll save time and money with this multi-purpose HD-1 drill on the job!

LOOK TO THE BIG "F"



FOR FINEST RIGS MADE

RATED CAPACITY:	Horizontal holes to a depth of 300 feet.
HORIZONTAL DRILLHEAD:	Rotary type with 30-inch stroke hydraulic feed. Provides a minimum of 2500 pounds thrust per 100 P.S.I. hydraulic pressure. Rotary has four forward speeds and one reverse. Designed for continual feed flush joint drill pipe, eliminating the need for a kelly. Drive rod assembly available in a choice of three sizes. The 2 3/8" size is standard while 2 7/8" and 4 1/4" sizes are optional.
HOISTING MECHANISM:	Ramsey "600" winch, driven through a side mounted power take-off with two forward speeds and one reverse.
TRANSMISSION:	Heavy duty truck type with four forward speeds and one reverse speed. Gear changes in the main transmission do not affect the speeds of the oil pump, mud pump or hoisting mechanism.
OIL PUMP:	Vane type with maximum operating pressure of 1000 P.S.I. Hydraulic system has built-in safety valve to release pressure in excess of maximum working pressure.
MUD PUMP:	Gardner Denver Type CE high pressure centrifugal. Driven through friction clutch.
CONTROLS:	Operating controls conveniently grouped at driller's station.
POWER UNIT:	Ford 4-cycle industrial type gasoline engine with 172 cu. in. piston displacement.
DRILL FRAME:	Structural steel skid equipped with removable single axle (10,000-pound capacity) and removable front dolly (3000-pound capacity) with tongue attached. Four hydraulic leveling jacks are provided... one on each corner of the frame. Two main tires, 7:50-20 8-ply; front dolly tire, 6:00-9 8-ply.
WEIGHT:	With standard drillhead, less operating equipment, 5120 pounds.



GEORGE E. *Failing* COMPANY
A SUBSIDIARY OF WESTINGHOUSE AIR BRAKE COMPANY
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SALES AND SERVICE . . .
continued

In the Main Office

Minneapolis-Moline Co.: Maxwell M. Wachowiak has been appointed director of manufacturing and James A. Miller has been appointed director of engineering.

Atlas Copco: Atlas Copco A. B. of Sweden has appointed Jack E. Heuser president of their two companies in the U. S. As president of Atlas Copco Pacific, Inc., and Atlas Copco Eastern, Inc., he will be responsible for co-ordinating company operations in the United States.

Stenberg Mfg. Corp.: Tor R. Bengtson has been named general manager of the company. Stenberg manufactures and distributes Flygt submersible electric pumps.

Associations

Wire Reinforcement Institute: Warren D. Dreher, wire products sales manager, Western Division, Colorado Fuel & Iron Corp., has been elected president of the Institute. Bruce D. Bennett, manager, construction material sales, American Steel & Wire Division, United States Steel Corp., has been named vice president.

The Asphalt Institute: The following appointments have been announced: James A. Burton of Boise, Idaho, district engineer for the states of Idaho and Montana; Lawrence K. Murphy of Augusta, Maine, district engineer for New England; Manse Randolph Sharp, Jr., assistant engineer, Dallas office; and Herbert C. Higgins of Olympia, Wash., as district engineer for Washington and Alaska.

Special Mention

Allis-Chalmers Mfg. Co.: Allis-Chalmers has acquired the Tractomotive Corp. of Deerfield, Ill., by an exchange of stock. It becomes the 21st plant in the Allis-Chalmers family and will be operated as the Deerfield works.

Vulcan Materials Co.: Vulcan has acquired three construction companies who have been frequent participants in joint venture heavy construction work in the U. S. and overseas. The companies are: Ralph E. Mills Co.; Talbott Construction Corp.; and Talco Constructors, Inc.



Here's why torque converter equipped machines do more work at lower operating cost

For higher work capacity on any given load, and for greater all-round daily production, more and more contractors are specifying torque converter drives in their new excavators, erecting cranes and loaders. And here are five good, profitable reasons why the torque converter is the preferred type of drive:

1. The torque converter eliminates lagging and stalling... permits engines to work at maximum efficiency delivering constant high-horsepower output for heavy digging loads and fast swinging.

2. Smooth converter power reduces peak loads throughout the machine's drive train because fluid within the converter absorbs much of the impact energy caused by quick drum speed change... thus protecting both driving and driven equipment.

3. When necessary, the torque converter smoothly delivers approximately twice normal torque to the drum, which, at slow digging speeds, represents an important advantage in power delivered to the dipper.

4. Cable life is extended since no sharp impact loads ever reach cables through the torque converter... constant line tension is maintained... there's no jerking or snapping.

5. An infinite variety of ratios is available to work with... permitting smooth, accurate, safe control of loads and delicate "inch" and "holding" under power... as well as adjusting for wide variations in dipper loading, substituting greater digging effort for speed, when required.

Wherever earth and rock are moved, wherever steel is erected, you'll find contractors using these five advantages... to convert their horsepower into greater-than-ever profits!

• • •

Twin Disc Torque Converters—*three-stage or single-stage*, from 30 to 1000 hp—are available from all leading manufacturers of heavy-duty machines. Be sure to specify one in your next unit. Take advantage of the five reasons why torque converter equipped machines do more work at lower operating cost.

Twin Disc is the world's leading manufacturer of friction clutches and fluid couplings for heavy-duty industrial applications... and the only manufacturer producing both three-stage and single-stage torque converters. Because of its complete line of industrial drives, Twin Disc can offer unbiased recommendations for any heavy-duty power transmission application.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • LOS ANGELES • NEWARK • NEW ORLEANS

Construction Equipment News...



Small Crawler Tractor Handles Variety of Jobs

International's small T-340 crawler tractor handles backhoes, loaders, dozers, and skid shovels.

A 45-hp four-cylinder gasoline engine powers the 5,600-lb tractor. It has a maximum drawbar pull of 8,000 lb and is available with either 38 or 48-in.-gage tracks.

Five speeds forward and one in reverse give it a speed range of 1.5 to 5.9 mph. An optional torque amplifier drive gives the tractor two speeds in each gear. A fast reversing attachment for loading operations permits changing direction without shifting gears.

Also available are a No. 65 International Wagner backhoe and a No. 465 loader. The loader can lift 3,500 lb and has a $\frac{5}{8}$ -cu yd struck capacity. The backhoe digs to a depth of 10 ft and can operate at right angles to the tractor.

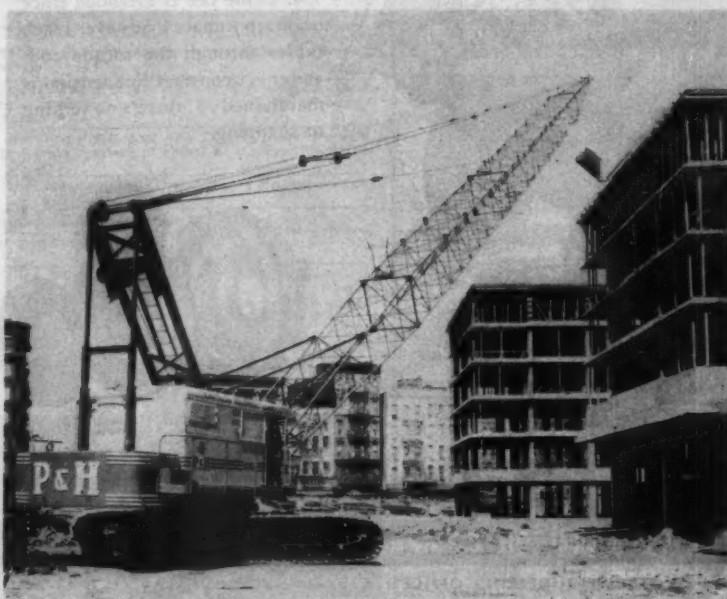
—International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

Boom Has Long Reach, Can Lift Heavy Loads

This crawler-mounted crane is capable of handling a 300-ft boom. With a 60-ft boom it can lift 110 tons at a 15-ft radius. The crawler assembly is 16 ft 10 in. wide. It is constructed of high-strength alloy steel with integral axle extensions.

The swing assembly has no friction swing clutches. Power is transmitted electromagnetically through the P&H magnetorque. This eliminates lining replacements, clutch adjustments, and conventional clutch maintenance.

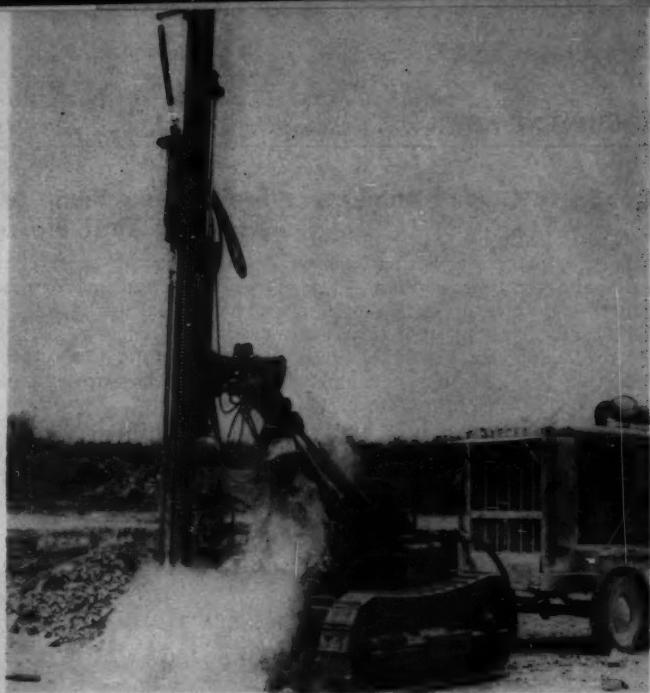
—Harnischfeger Corp., 4400 West National Blvd., Milwaukee 46, Wis.



Air Power Moves Crawler, Hydraulic Power Moves Mast

Hydraulic power on this rig permits swinging, sliding, raising, and lowering of the drill mast for any vertical, horizontal, or angular drilling position.

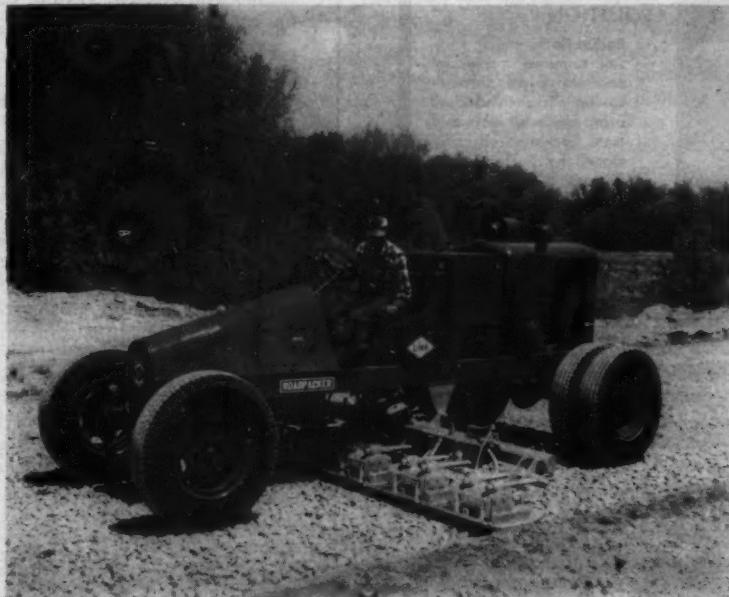
The Thor TR-5 rock drilling rig is mounted on a self-propelled crawler chassis. Twin Thor 8-hp air motors power the chassis, and one 8-hp air motor powers the hydraulic system. The unit tows an air compressor behind it and is completely self contained—**Thor Power Tool Co., 175 N. State St., Aurora, Ill.**



Front End Has No Axle, Makes Short Radius Turns

There is no front axle in the new C Speedpull. The front wheel suspension consists of a gas-oil operated piston inside a frame-mounted cylinder. This permits the scraper to turn around in a 34-ft wide space. It has a 14-yd struck capacity.

A 276-hp Cummins diesel powers the 4-wheel prime mover. All scraper functions are electrically operated.—**LeTourneau-Westinghouse Co., 2301 NE Adams St., Peoria, Ill.**



Vibratory Compactor Has Adjustable Width

Six vibrator shoes give the new Roadpacker a compacting width of 13 ft. One or both end shoes may be folded back to adjust to the compacting width or to reduce overall width for traveling.

The D Roadpacker can compact granular materials in single lifts up to 12 in. deep at rates up to 600 tons per hour.

A fluid motor drives the unit while compacting. A dial selects any speed between 20 and 95 fpm. The rig is capable of travel speeds up to 30 mph. Waukesha and General Motors gas or diesel engines power the compactor.—**Baldwin-Lima-Hamilton Corp., Lima, Ohio.**

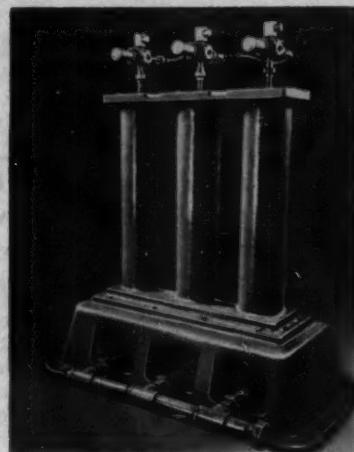
Concrete Curing Blanket

A white plastic-coated reinforced paper for concrete curing combines the features of reinforced paper and plastic curing. The manufacturer claims that this reinforced paper has good moisture retention and permits easy handling and maximum reuse. It is available in widths from 9½ to 25 ft.—American Sisalkraft Co., 55 Starkey Ave., Attleboro, Mass.

Free-Piston Pump Moves Anything That Flows

This new pump operates on compressed air and moves practically any material that flows. It can be used to pump water, concrete, asphalt, paint, or any other material. Air pressure of 1 psi raises water 2.2 ft.

The pump is similar in principle to a steam pump, but it has no packing or seals. In fact, it has



no moving parts such as a motor or engine, driveshaft or belt; and it requires no lubricants. The unit has three cylindrical chambers that consist of a top plate, a replaceable cylinder sleeve, and an inlet-outlet base unit. A free-floating nylon piston is located in each cylinder. There are two nylon ball check valves in each base. Valve material can be varied to meet special requirements.

The piston floats on the charge and eliminates turbulence and minimizes air absorption. It also seals the compressed air from the base unit. During operation, the three chambers fill by gravity or power and are emptied in sequence by the force of compressed air. A timing-control system automatically switches the air charge from one cylinder to another. The control system can be operated electrically, by a cam mechanism, or by pressure.

Material being pumped flows smoothly and without pulsating. The pump is noiseless and vibrationless. No safety or relief valves are required because the pump simply stops when a stoppage occurs. The pump can be submerged in the material being pumped. Any chamber can be stopped for cleaning or repairs while the other two remain in operation. It is cleaned by flushing through the inlet.

The dimensions of a 100-gpm model are 45x24x53 in. With a cast iron jacket and base this unit weighs 1,000 lb. Capacity can be varied by changing the air pressure and the size of the inlet and outlet. The pump can be built in practically any size.—The Crossley Machine Co., 301 Monmouth St., Trenton, N.J.

Another **BORTUNCO** *Success Story:*

BorTunCo has an established record with engineers and contractors for capable sub-contract job performance.*

PROJECT:

INTERSTATE HIGHWAY CONSTRUCTION, HOUSTON, TEXAS.

**CONTRACTOR:**

Russ Mitchell, Inc.

PROBLEM:

How to get 72" underground drainage pipe under street and railroad tracks without interrupting traffic.

SOLUTION:

BorTunCo Tunneling Division tunneled and jacked concrete pipe through caving slickensided clay, using powerful jacks and steel jacking rails designed by BorTunCo engineers.

*Negotiations and inquiries strictly confidential.

THE BORTUNCO GROUP

Road Boring and Tunneling Company, Inc.; Texas Road Boring Company of La.-Miss.; Boring and Tunneling Company of America; Texas Tunneling Company; Horizontal Holes, Inc.

**BORING AND TUNNELING CO. OF AMERICA**

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"Our CASE M-420 works where even a man can't walk"

— Sepich Construction Co., Columbus, Ohio



"If anyone had told me two months ago that a rubber-tired fork lift could move heavy loads through slippery clay like this, I'd have thought they

were crazy," reports Russell Sepich, partner of the firm and Vice-president of the Ohio Mason Contractors' Assn. "But this new 4000-lb. capacity Case M-420, with torque-converter drive has really amazed us. It goes through axle-deep mud, where even a man can't walk."

Torque-Converter Drive Does It!

Main reason for the outstanding "mud-ability" of the M-420 is an exclusive torque-converter drive, which doubles push-pull power instantly, automatically — without clutching, shifting or stalling. Up to 12,000 lbs. pull is transmitted smoothly to big high-flotation drive-tires. With rear-wheel power-steer

and individual brake-steering on drive wheels, the M-420 maneuvers easily in rough, rutted ground... "inches" up to scaffolds without jerking, or spinning the wheels.

Teams with Crawler Lifts on 836-Unit Housing Project

Sepich's new, rubber-tired M-420 joins a fleet of 4 Case crawler-mounted M-3 fork lifts on a large 836-apartment public housing project for the city of Columbus. According to Sepich, the 4 crawler units have kept materials moving

through 9 months of mud without a shutdown, *cut operating costs an estimated 40%*. "Addition of the higher-speed M-420 will make it easier for us to supply masons working greater distances from central supply dumps and mortar mixers," Sepich concludes.

Worth Looking Into

Your nearby Case Industrial Dealer will gladly demonstrate the new wheel-mounted M-420, or M-3B crawler, without obligation. Just mail handy coupon below.

■ ■ ■ CLIP . . . MAIL TODAY FOR FULL INFORMATION ■ ■ ■

J. I. CASE CO., Dept. H1499, Racine, Wis.

- Send free literature on M-420 fork lift M-3B crawler
 Have nearest dealer call to arrange demonstration

Name. Title.

Company.

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City. State.

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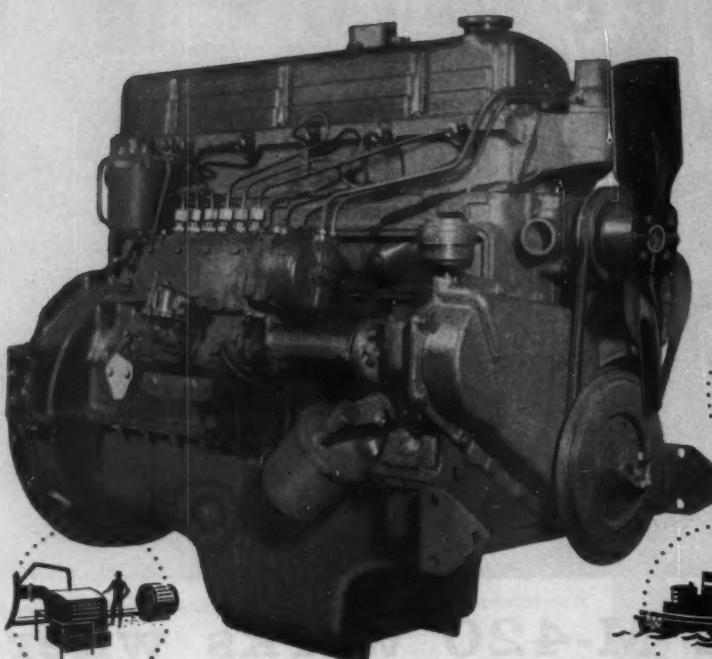


World's most advanced line of wheel and crawler machines for construction, earthmoving and materials handling

CASE

J. I. CASE CO., RACINE, WIS.

Whatever your application:



Modern FORD DIESELS are designed to give you the dependability you need...the economy you're looking for!

If your job demands dependable, economical power day after day, consider a Ford 220- or 330-Diesel installation.

Simple in design and modern throughout, both Diesels offer heavy-duty 12-volt ignition systems for fast all-weather starting . . . overhead-valve construction for higher engine compression, more power . . . and four-way fuel injectors for efficient combustion, greater operating economy.

Quality-built by the most modern production methods, these Diesels are also low in initial cost. And because prompt Ford service is available almost everywhere, Ford Diesel users can count on a minimum amount of downtime.

For these reasons and more, a Ford Diesel can cut your operating costs . . . handle a greater work load. Therefore, specify Ford Diesels for original installation or for engine replacements. Write for details today.

ENGINE SPECIFICATIONS		220	330
Basic Model		X	Y
Number of Cylinders		Four	Six
Bore and Stroke—Inches		3.94 x 4.52	3.90 x 4.52
Displacement—Cubic Inches	Dynamometer	220	330
	Continuous		
Brake Horsepower	Dynamometer	60 @ 2250	96 @ 2250
	Continuous	48 @ 2250	77 @ 2250
Torque	Dynamometer	151# @ 1600	236# @ 1600
	Continuous	121# @ 1600	189# @ 1600
Compression Ratio		16 to 1	16 to 1



INDUSTRIAL ENGINE DEPARTMENT • FORD Division of FORD MOTOR COMPANY
P. O. Box 598, Dearborn, Michigan

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

EQUIPMENT NEWS...continued

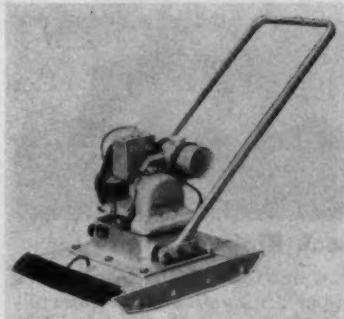


T-1 Steel Boosts Payload

Extensive use of T-1 steel in the Athey PR619 rear dump trailer reduces deadweight and increases the payload by 15%. T-1 is a high-strength steel developed by the U.S. Steel Corp. This 25-ton unit hauls up to 20 cu yd heaped. The trailer is a companion unit to Caterpillar's No. 619 tractor.

Design features include a flared body top to give a bigger loading target and spill deflectors to retain the load and protect tires and hydraulic system during loading. The reinforced cellular floor strengthens the body and allows installation of body heating. The hoists are self-aligning, and the hydraulic system has a new gear-type pump.

The trailer can raise its load to a 57-deg dump angle in 12 seconds. Speed, with the Caterpillar No. 619 tractor, is 30.2 mph.—
Athey Products Corp., 5631 West 65th St., Chicago 38, Ill.



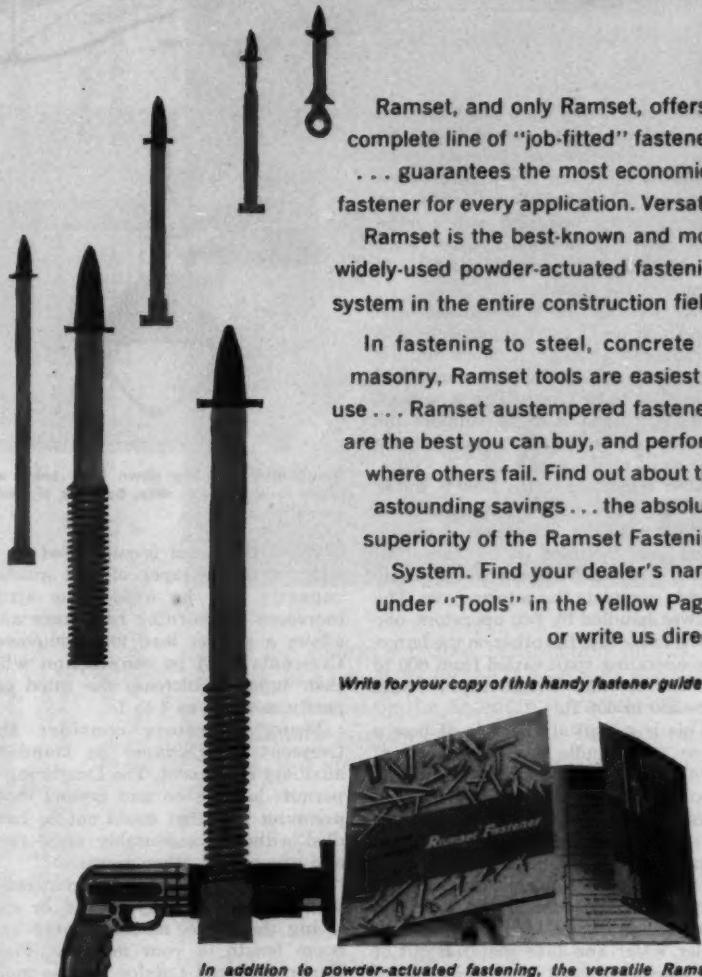
Vibrating Plate Compacts Sand, Asphalt

This vibrating plate tamper delivers 5,000 blows per minute. It can be used for compacting sand, gravel, cold or hot bituminous mix, and other materials. The unit has a built-in water attachment to prevent asphalt adhesion.

The Wacker Vibro-Plate VPG 1500 weighs 135 lb. The plate size is 19x24 in. A 3-hp engine powers the unit. It has a reversible shock-absorbing handle.—
Wacker Corp., Hartford, Wis.

ONLY RAMSET

offers over
100 different
powder-driven
fasteners
for specific jobs

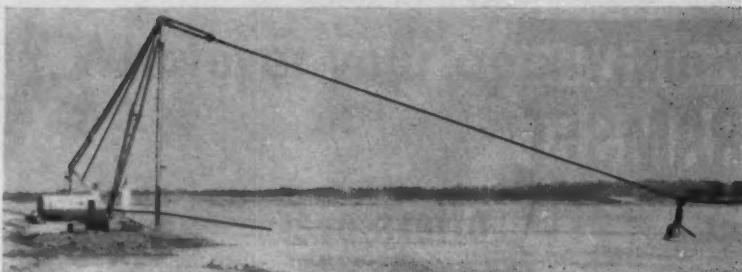


Write for your copy of this handy fastener guide

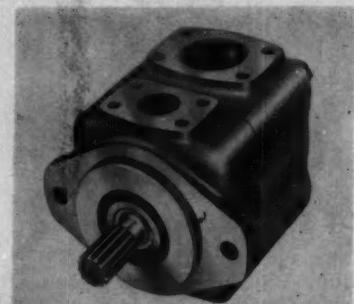
In addition to powder-actuated fastening, the versatile Ramset System includes Shure-Set hammer-in tools for light fastening, and Ringblaster heavy-duty kiln gun.

Ramset Fastening System

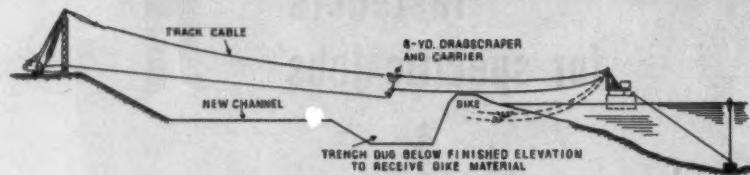
WINCHESTER-WESTERN DIVISION • OLIN-MATHIESON CHEMICAL CORPORATION
12103-H BEREA ROAD • CLEVELAND, OHIO



EQUIPMENT NEWS...continued



Eight-Yd. Sauerman DragScraper Cuts Seaway Dike Removal Costs



Atlas Construction Co. Ltd., Montreal, Que., had the job of enlarging the St. Lawrence Seaway channel near Iroquois, Ont. An 8-yd. Sauerman Crescent DragScraper and four-wheeled carrier was used with a crane to remove the perimeter dikes composed of tough digging glacial till and to backfill the trenches.

The hoisting line of the crane, used as a track cable for the Crescent and carrier, ran through a block on the boom tip to a 25-ft. tail tower mounted on a 20 x 40-ft. barge. The structural steel spud mast used to support the boom was pin-connected to facilitate movement of the crane.

After inhaling to the trench, the 8-yd. Crescent was gravity-retumed part of the way to the excavation. A single-drum hoist mounted on the barge tail tower controlled the backhaul cable used to complete the return cycle. The job was handled by two operators, one on the crane and the other on the barge. The operating span varied from 600 to 900 ft. Average DragScraper hauls were 300 to 600 ft.

This is a typical example of how a crane can handle a Crescent DragScraper of greater capacity than the original dragline bucket or clamshell. Larger machines can usually double their capacity with a DragScraper. Smaller units can handle about 50% more. Machine range is limited only by the spooling capacity of the hoist drums. It can reach farther, dig deeper under water and take material out of soft areas without the nuisance of mats and the hazard of undermining the crane.



DragScraper traveling down track cable on return to underwater dike. Barge is in background.

When the boom is supported by a strut, a DragScraper of still greater capacity can be used. The strut increases overturning resistance and allows a greater load to be imposed. Crescents used in conjunction with such supports increase the rated capacity as much as 4 to 1.

Many operators consider the Crescent DragScraper as standard auxiliary equipment. The DragScraper permits bidding on and getting those premium jobs that could not be handled without considerably more time and expense by other means.

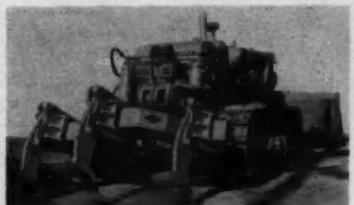
Find out how much you can increase your crane's capacity. Write or call giving the make, model number and boom length of your machine. Field Report 228 and Catalog J gives more information on DragScraper operations with cranes.

Hydraulic Pump

Operating speeds of up to 2,000 rpm and pressures of up to 2,000 psi are features of a new hydraulic pump designed for earthmovers. Three models of the series 45 pump deliver 52, 63, and 75 gpm at 2,000 rpm and 2,000 psi. At 1,200 rpm and 100 psi the deliveries are 34, 41, and 48 gpm.

One pump housing accommodates any of the three pumping cartridges. The cartridges contain all wearing parts of the pump. The inlet of the four-position cover can be rotated with respect to the outlet in 90-deg increments. The four-bolt SAE flange connections will also accommodate two-bolt flanges of proper design.

—Vickers, Inc., 1402 Oakman Blvd., Detroit 32, Mich.



Rock Ripper

Two models of the Ateco rock ripper are available for Caterpillar D8 series H tractors. The HR48-D8H has an offset tool beam with clearance for mounting on tractors with No. 29 rear cable control. The HR-D8H has a standard straight tool beam.

Both models will rip with one, two, or three shanks to a maximum depth of 48 in. Straight or curved shanks for 25, 42, or 48-in. depths are available. The shanks have replaceable points. Clearance under the tool beam when ripping is 14 in.—American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif.

SAUERMAN

50th Anniversary Year

Crescent DragScrapers • Slackline and Tautline Cableways • Duralite Blocks

612 SO. 28th AVE.
BROS., INC. BELLWOOD, ILL.
Linden 4-4892 • Cable CABEX—Bellwood, Illinois



Bethlehem wire rope along the Niagara. One of the country's busiest construction jobs is the Niagara Power Project now in full swing near the famous Falls. Being built under the direction of the Power Authority of the State of New York, it will harness the maximum potential on the American side of the Niagara River. Bethlehem wire rope is in constant use at many locations on the Niagara Power Project. Lifting a variety of heavy loads, and moving thousands of tons of earth and rock, it is providing the same dependable service as on less spectacular construction jobs throughout the nation.

Upon completion, this project will have an installed capacity greater than Grand Coulee Dam, currently the country's largest hydroelectric development. A new intake gate structure above the Falls will divert river water through four miles of underground conduits and one mile of open canal to the main 1,950,000 kw power plant. In addition, a pump-generating plant will produce an additional 240,000 kw during periods of peak demands. Treaty restrictions limit the amount of water which can be diverted from the river for power purposes, assuring that the grandeur of the Falls will in no way be diminished for tourists.

Bethlehem Steel Company, Bethlehem, Pa. Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem wire rope

BETHLEHEM STEEL





Blaw-Knox PF-45 placed 350 tons of ID2 mix on warehouse floor. Machine handles hot or cold mixes; saved Harrison Construction a day and a half on the inside alone.



"The PF-45 was ideal for paving this 4600 square-yard warehouse floor"

"We saved ourselves at least a day and a half. It would have taken that much longer to place the asphaltic concrete inside if the job had been done manually," reports Joe Mesaros, bituminous paving superintendent for Harrison Construction Company, Pittsburgh.

"The PF-45 proved ideal—since it can maneuver around so easily," he adds. Harrison used the Blaw-Knox PF-45 to place bituminous concrete one-inch thick over 4600 square yards of

floor inside a large steel warehouse. Outside, this same Blaw-Knox Black Top Paver placed 2700 square yards of bituminous over a parking area and driveway.

Indoors and out, the speed, maneuverability, and capacity of the Blaw-Knox PF-45 enables contractors to take on a wider variety of small jobs—playgrounds, alleys, driveways, even warehouse floors, at a profit. Ask your Blaw-Knox distributor for complete details.



BLAW-KNOX COMPANY

Construction Equipment • 300 Sixth Avenue • Pittsburgh 22, Pennsylvania



New Line of Heavy Trucks

Four new tandem-axle White trucks are designed for use with dump bodies, dump trailers, concrete mixers, or flatbed bodies.

The White 2064, 4264, and 9064 trucks are gasoline-powered. Horsepower ranges from 145 to 215. The three trucks have gross vehicle weights from 35,000 to 75,000 lb. Wheelbases range from 150 in. to 224 in.

The 4464D truck is diesel-powered. A 180-hp engine is standard with optional engines of 190 and 220 hp. The diesel truck has a gvw range of 45,000 to 75,000 lb. It has wheelbases of 176 to 224 in.

A five-speed main transmission with a three-speed auxiliary is standard on all models. A variety of power take-off positions are available. Rear axles have single reduction, double reduction hypoid, or double reduction planetary differentials.

Standard wheels are cast spoke-type with optional disc wheels. Front and rear springs are semi-elliptic. A 12-v starting and lighting system is standard on the gasoline models. The diesels have 24-v starting and 12-v lighting systems. A U-shaped channel structure supports the radiator, front fenders and their assemblies.

Various parts of the trucks are removable for easy maintenance. The radiator core can be removed by unbolting the front grille without removing the radiator shell. The bumper and front fenders also can be removed.—The White Motor Co., 842 E. 79th St., Cleveland 1, Ohio.



Big Capacity Truck Crane

The Lorain MC-875 Moto-Crane has a capacity of 80 tons. Boom lengths range up to 200 ft, and an additional 40-ft tip extension is available. Both boom and tip extension are of square-tubular-chord construction with continuous round tubular lacing. Boom sections are pin connected.

The turntable is mounted on the carrier by the Lorain Shear-Ball method. It consists of 70 hardened steel balls sealed in precision-ground steel races that take all vertical, horizontal, and radial loads and thrusts. There is no need for a center pin and nut, centering gudgeon, or any turntable rollers; no lubrication is necessary.

The turntable features a spur gear driven boom hoist, anti-friction bearing mounted hoist drums, and a power operated tilting and folding gantry. All controls are air-powered. Two levers apply air to all turntable clutches.

The box-section frame from the front bumper to the rear outriggers, with mounting plate, mounting pads, and outrigger boxes is cast as one integral part. The unit has a torque converter with 10 travel speeds. Top speed is 20 mph.—The Thew Shovel Co., Lorain, Ohio.

Motor-In-Head Vibrator For Low Slump Concrete

This 115-v vibrator operates at 10,500 vpm and is designed for use in low slump concrete. The M-21-M hi-cycle vibrator can be used with any 115-v, 180-cycle generator. A 220-v model M-21 is also available for use with 200-v, 180-cycle generators.

There are no brushes or commutator in the motor. The vibrator head can be opened easily for inspection or minor repairs. A waterproof off-on switch controls operation.—White Manufacturing Co., Elkhart, Ind.

slack track
costs
jack!



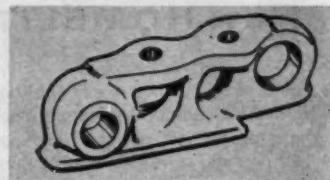
Even "the toughest track ever made" (Allis-Chalmers, of course) needs adjustment to give you the extra life that's built into it. Make this on-the-job track check.

Take a pry bar and see how far you can raise the track above one of the support rollers. More than two inches means it's too loose. Take up the slack, move the tractor back and forth to equalize the tension, then check again.

Regular track inspection is an easy way to make sure you get the most out of "the toughest track ever made."

WHAT **toughest** REALLY MEANS

It's more than just talk. Take sidebars, for instance. Some track makers get by with mere surface hardening, which sacrifices wearing quality for easier machining. But Allis-Chalmers deep-hardens the forged steel, leaving a tough inner core for high impact strength. Then, pin and bushing bores only are annealed, and the superhard sidebar is machined to precise finish dimensions.



The moral of the story: Stay on the right track—"the toughest track ever made." Get original-quality parts from your Allis-Chalmers dealer.

move ahead with
ALLIS-CHALMERS
power for a growing world





USED BY MEN WHO BUY EQUIPMENT FOR WHAT IT SAVES

More For Your Money New HOMELITE 3000 Watt Generators

You get more, you save more, with the new Homelite Model 8A Generators. You get more production power. Weighing only 140 pounds, complete with built-in gasoline engine, the 8A gives you 3000 watts. You get the power you need for electric saws, drills, floodlights and other labor-saving tools. You get the power you need for more work in fewer man-hours, quickly and easily.

Just as important, you get more performance with less maintenance and less operational trouble with the new Home-

lite Model 8A Generators. No rheostats or other controls to operate. Voltage is automatically controlled within four percent from no load to full load. There are no DC brushes. No commutator. No DC windings on armature. No trouble makers to slow down work and run up fix-it costs.

Three models are available . . . 115 volt and 115/230 volt, both 60 cycles, AC plus the 180 cycle model for running most efficient high cycle tools. Ask for free demonstration soon. The sooner the better for you.

Homelite factory branches are located throughout the country. Your nearest one is as near as your phone. Call them or write for convincing demonstration or rapid service in any way.

HOMELITE
CARRYABLE
GENERATORS PUMPS·CHAIN SAWS
BLOWERS



HOMELITE • A DIVISION OF TEXTRON INC., 1008 RIVERDALE AVE., PORT CHESTER, N.Y.
In Canada — Terry Machinery Co., Ltd.

COMMENT

from the
BUTLER ENGINEER

... of rumors replete with conjectures

How news does get around the cement handling industry! And often in such cases the news is cloddy with rumors—often quite unfounded.

The recent discussions of self-unloading cement transports which put the cement directly into your bin are examples. Some rumors had it that these are the complete and perfect solution to all cement handling . . . other whispers said they were entirely impractical.

Well, they are here, they're good and they have a very definite place—with some qualifications.

Perhaps your plant is in an area served by these cement transports. Or if it is not, very probably it soon will be . . . at any rate, you're going to be hearing a lot of rumors, pro and con. What's the best way of determining what you should do to take the utmost advantage of this development? Well, Butler Bin has made very careful investigations and is well prepared to make specific and individual recommendations. Moreover, Butler Bin will provide auxiliary equipment best adapted to your problem.

So why not ask the Butler Engineer? It's as simple as that. There is a Butler Ready Mix Plant—an HP-85—on a high pressure schedule supplying concrete for the first Atlas missile base. This is said to be the highest priority construction job in the entire country.

The erection of the HP-85 was started at 9:00 A. M. and finished at 4:00 P. M. the same day. This takes 3 talents: a knowledgeable crew; highly astute management and the top flight portability that only Butler provides.

Shoot at that mark, gentlemen.

The Butler Engineer

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

EQUIPMENT NEWS...continued



Portable Dredge

The Ammeo Hydra-Drive portable dredge can be assembled for operation in two days. It has removable ladder sections for digging at variable depths. An additional engine can be installed in the field to drive the dredge pump for pumping extreme distances or elevations without loss of capacity.

A complete control system of all machinery is housed in an elevated control room. The operator has complete vision of all dredging operations from the control room. Dredges are available in sizes from 8 to 18 in.—American Marine and Machinery Co., P. O. Box 1150, Nashville, Tenn.



One-Man Operated Auger

The improved Prewitt portable auger drill weighs only 525 lb. One man can perform all drilling operations by means of simple control levers. The unit is mounted on three pneumatic tires. The feed screw and auger fold over during transportation.

A 5.5-hp Wisconsin engine powers the auger. It bores holes 4 to 12 in. in diameter and up to 40 in. deep.—J. R. Prewitt & Sons, Dept. R., Pleasant Hill, Mo.

that last
1/2 inch can
cost the most

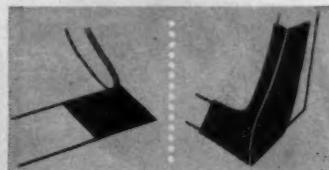


Don't kid yourself! An extra half inch of wear on the cutting edge of your dirt-mover can cost you plenty! Wear that chews into the moldboard weakens it—especially around bolt holes. Then you may have to rebuild or even replace the whole works!

Renew or replace cutting edges and bits before moldboard wear starts. You'll be money ahead on repairs and 'way out front in dirt-moving efficiency.

ONLY THE BEST IS A BARGAIN!

Speaking of moving dirt, Allis-Chalmers really has the edge! Take dozers, for instance. Cutting edges and end bits are made of finest alloy steel, forged and electronically heat-treated in a process that deep-hardens working faces for extra-long wear, toughens the core to resist impact. For rock-dozing or worse, Allis-Chalmers makes heavy-duty edges, end bits and wrap-around end bits.



The man from your Allis-Chalmers dealer knows all about moldboards—for a new machine or reconditioning one you own—and the edges he recommends are right. Whatever you need, get original-quality Allis-Chalmers parts—made for the machine, best for the job.

move ahead with
ALLIS-CHALMERS
power for a growing world



2 NEW, ALL-NEW CRANES FROM AUSTIN-WESTERN

A-W CRANES ARE—

- ECONOMICAL • HIGH PRODUCERS
- VERSATILE • EASY TO MAINTAIN
- HIGHLY MANEUVERABLE • FAST, MOBILE

Austin-Western now offers you a complete line of LIFT, CARRY and PLACE equipment . . . designed to make more profit for you in every operation! Investigate. See your nearby Austin-Western distributor today or write us.

ALSO AVAILABLE:

MODEL 210

5-ton range
self-propelled

MODEL 210-P

5-ton range

for truck or
stationary mounting

MODEL 220

6-ton range
self-propelled

NEW MODEL 410

10 TON CAPACITY RANGE

- 11' 1" overhead clearance
- Hydraulic topping
- All-wheel drive
- Torque converter
- Continuous 360° boom rotation
- Boom raises to 60° from horizontal
- Short 15' 8" turning radius, 17' 8" w/outriggers
- 25' telescoping boom can be extended to 47'
- Power booster front-steer
- Full hydraulic rear steer
- Hydraulic outriggers
- Gas or diesel power
- Self-propelled; speeds to 23 mph plus
- Unobstructed visibility
- 10', 22' manual boom extensions

NEW MODEL 110

3-5 TON CAPACITY RANGE

- Low 8' 10" overhead clearance
- Hydraulic cable hoist
- Boom swings 220°
- Torque converter
- Power booster steer
- Rear trunnion steer
- Road speed 2-15 mph
- Outlifts all other 3-wheel cranes over-the-side!
- Hydraulic topping
- 18' 7" boom reach
- Unobstructed visibility
- Full reverse transmission
- Dual front driving wheels
- Gas powered, self-propelled
- Boom raises to 50° from horizontal



Available with wide range of accessories for added versatility!

Austin 1909-1959
AUSTIN-WESTERN
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Power graders • Motor sweepers • Road rollers • Hydraulic cranes



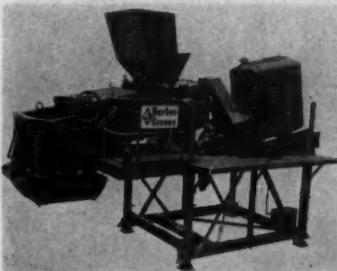


Chain Conveyor Moves Building Materials

The flights on this conveyor are carried on a single chain at the center of the pan. The conveyor can move building materials at speeds of up to 100 fpm. The unit is 12 in. wide and has a loading height of 18 in. above the base. It can be elevated up to 60 deg. The basic 22-ft conveyor can be extended to any length with 10-ft extensions. No extra bracing is required for 32 and 42-ft lengths.

Two models of this conveyor are available. The standard conveyor has low sides and tall flights and can handle masonry and other types of materials. The bulk handling unit has higher sides and moves gravel, light aggregates, dirt, and any material that fits between the sides.

Either gasoline or electric power may be used to drive these units. The drive system requires no adjustment regardless of changes in elevation.—Morgen Manufacturing Co., Yankton, S.D.



Stabilization Plant

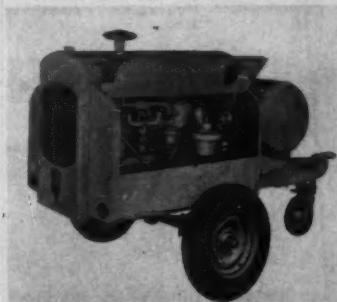
Stabilizing agents that this plant can handle include water, cement, fly-ash, bitumen, chlorides, and emulsions. Aggregate materials such as crushed stone, gravel, and sand as well as clay and soil can also be used.

The pugmill has no liners because the material forms its own liners. Paddle arms are reversible and easily replaceable. The main gearbox is totally enclosed,

and the gears run in oil. The 1½-ton discharge hopper has hydraulically operated clamshell gates.

The water system consists of a volumetric displacement meter and spray piping for 60 gpm with optional piping for 90 gpm. Individual globe valves regulate the quantities of water, and a shut-off valve is used when stopping or starting the pugmill.

All the controls are grouped in one location. The pugmill is covered with a steel grating, and the mixer has a stairway, operator's platform, and handrails. The 824 Stabilization Plant can be equipped with wheels axles, and towing tongue for transportation. It is raised into position on its four telescoping jackslegs.—**Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.**



Piston-Type Compressor

A single-stage, piston-type portable air compressor has a capacity of 125 cfm at a speed of 1,300 rpm. The Le Roi 125G1 delivers enough 100-psi air to power two heavy or three medium breakers, one medium or two light sinkers, or one light wagon drill. Engine speed varies according to air demand.

A four-cylinder gasoline engine powers the two-cylinder compressor. No clutch or coupling is needed because the engine and the compressor have a common crankcase and crankshaft. There is also only one pressure type lubrication system. The unit has a 12-v electrical system with ignition and starting controls and all gages grouped on one panel. All cylinders have replaceable sleeves.

Additional features include tool boxes that extend the full length of the lockable housing, an all-welded steel frame, and a retractable caster wheel.—**Le Roi Div., Westinghouse Air Brake Co., Milwaukee 1, Wisconsin.**

how much for a mud overcoat?

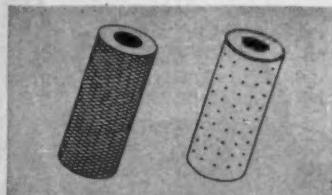


A thick mud overcoat on your tractor engine could cost you more than mink! Mud acts like insulation, impairs cooling of exposed surfaces—and you may be heading for an expensive overhaul. In any case, overheating steals power, spoils lube oil and cooks the life out of engines.

Hose the day's mud off. Clear away dirt or brush—especially around the engine and radiator. This not only helps cooling, it may also uncover trouble before it starts costing you money!

KEEP IT CLEAN INSIDE, TOO!

Efficient filter protection keeps Allis-Chalmers engines clean *inside*. Large fuel filters, full-flow oil filters and oil bath air cleaner with pre-cleaner are on guard against all kinds of sneaky, wear-causing dirt particles you might never see.



Help your engine live a long, healthy life. Service filters regularly and replace elements at recommended intervals. The service expert from your Allis-Chalmers dealer knows best replacement periods for any conditions. See him for genuine Allis-Chalmers replacement filters—made for the machine, best for the job.

move ahead with 
ALLIS-CHALMERS
power for a growing world

VERSATILE!

1 Mobile Drill now does all 4

AUGER BORING
PERCUSSION DRILLING
SOIL SAMPLING
CORE DRILLING

*the new, powerful***B-52 pacemaker****HYDRAULIC ROTARY****DRILL** with the
exclusive Hollow Stem**Auger**...lets you sample
while you bore!**ONLY 4-IN-1 RIG ON
THE MARKET...**

Mobile Drill's new B-52 PACEMAKER brings you unequalled versatility to meet today's demand for greater drilling speed and flexibility. Here's a rugged, powerful, heavy-weight workhorse that mounts on 1 or 1½ ton vehicles and will drive 5' sectional augers to 150'... N rods to 600'... and A rods to 1000'.

**BIG POWER
...BIG PERFORMANCE!**

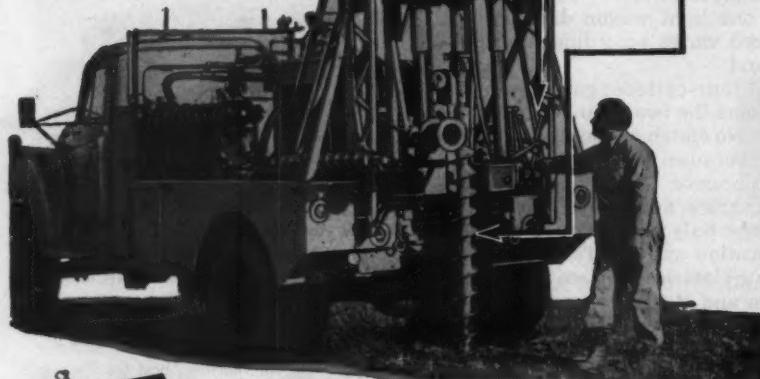
PACEMAKER's twin hydraulic feed develops 10,000 lbs. hydraulic ram force! Rig has own independent power plant, variable speed control on rotary drive.

**COMPACT...SELF
CONTAINED**

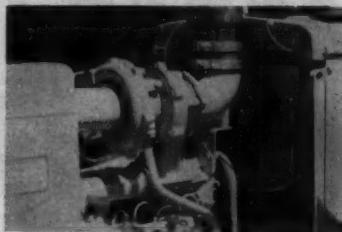
Custom mountings are designed to meet your needs, special body fabrications provide storage racks for augers and watertight compartments for tools and accessories... everything to make the PACEMAKER a mobile, fast moving, time saving unit.

**WRITE FOR BULLETIN
TODAY!**

For free illustrated folder and complete specifications on the new B-52 PACEMAKER, write

**MOBILE DRILLING, INC.**Dept. 18, 960 N. Pennsylvania St.
Indianapolis 4, Indiana

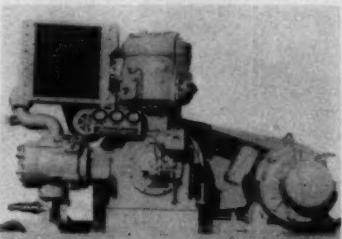
... From lightweight, jeep-mounted rigs to heavy-duty all purpose drills—MOBILE DRILL CAN MEET YOUR NEEDS! All drills mounted to your specifications.

**Small Turbocharger
Weighs Only 24 Lb**

The smallest turbocharger developed by International Harvester is 7½ in. in diameter and weighs only 24 lb. It is designed for use with the TD-9 crawler tractor. When fitted to the International D-282 six-cylinder diesel engine, the turbocharger boosts power output by 23% over that of the naturally aspirated version of this engine.

Turbocharging increases the volume of air fed into the engine so that greater quantities of fuel can be burned. This new turbocharger accomplishes this by supplying compressed air to the engine intake manifold.

The unit consists of a single-stage centrifugal compressor mounted on a common shaft with a single-stage radial inflow turbine. It has a one-piece main housing, a turbine housing, and a compressor housing. Engine exhaust gases actuate the turbine wheel; it, in turn, drives the compressor impeller.—International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

**Air-Cooled Compressors
Are Semi-Portable**

Two air-cooled, semi-portable compressors deliver from 311 to 635 cu ft of air per minute at 100 psi. The AT-1 compressor delivers from 311 to 374 cfm, and the AT-3 has an output of 533 to 635 cfm. Both units are mounted on skid frames. The units are designed for operation under extreme temperature ranges and in



Moline power, ruggedness, speed service line trenching



Moline direct-drive pump boosts backhoe capacity — The Moline 445 Wheeler powers this backhoe through a rear-mounted hydraulic pump, direct-driven from the crankshaft. Direct-drive steps up efficiency, eliminates unnecessary drive gearing, improves fuel economy. Side-mounted pumps are also available.

Milwaukee contractor cites fast response, low maintenance on Moline 445 Industrial Wheeler

"We've operated our Minneapolis-Moline 445 Wheeler on trenching jobs for the past 12 months," says Paul J. Grunau of the Grunau Company, Milwaukee, Wisconsin. "We like the fast power response and all-around ruggedness of our Wheeler. Down time and maintenance cost has been *practically nil*."

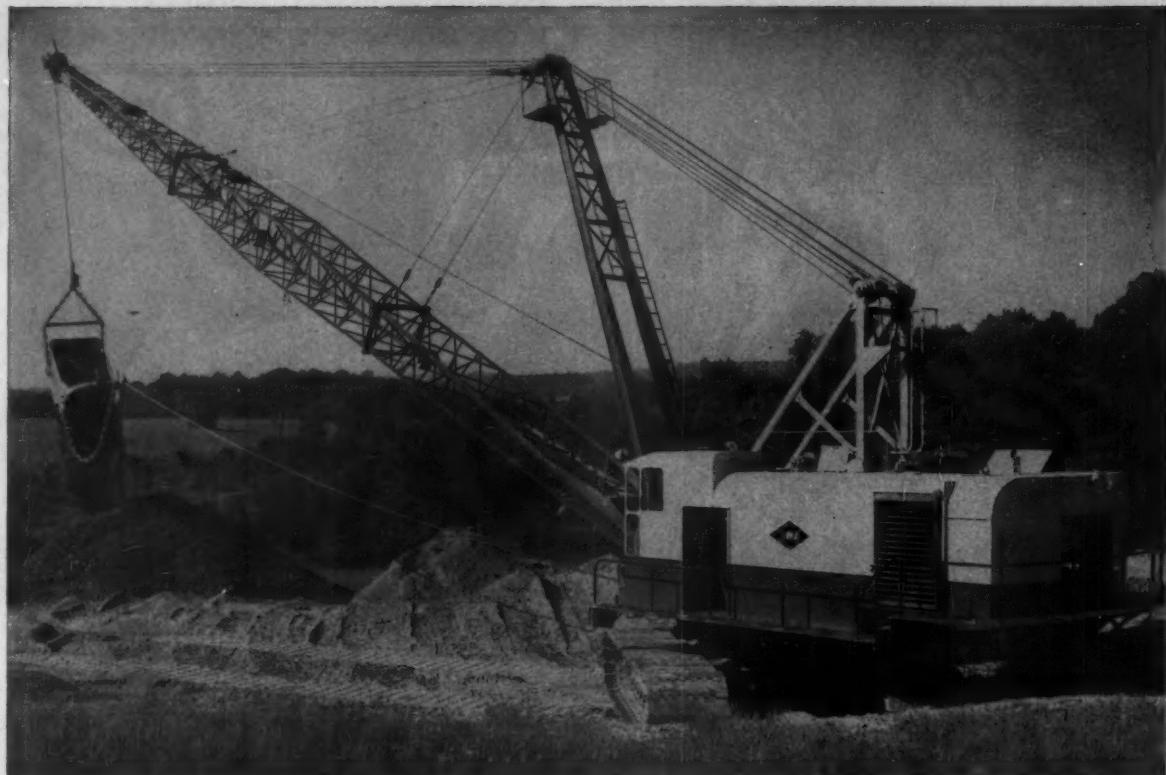
Grunau's Wheeler is equipped with a Moline backhoe and $\frac{3}{4}$ yard loader. Trenching operations have taken the unit over soft and rough grade, inside and out of buildings, excavating and backfilling for sewer and water lines, as well as loading and boom work.

Moline Industrial Wheelers offer many profit-making advantages on rugged, year-round construction service. Husky, Moline-built high-turbulence diesel or gasoline engines, optional shuttle reverse or Ampli-Torc 12-speed drive, direct-drive hydraulic pumps—and built-in hydraulic steering speed work cycles . . . cut job costs.

Heavy-duty Moline Industrial Wheelers are available in 4 sizes, with diesel or gasoline engines, complete with Moline loader-backhoe attachments.

Check with your Minneapolis-Moline Dealer for facts on the newest in work-tested construction equipment.

**MINNEAPOLIS
MOLINE**



This Torcon-equipped dragline gets more work by the bucket with less work by the engine.

Self-contained oil circuit keeps TORCON efficiency high

This simple design feature is a big factor in keeping TORCON efficiency consistently high: the oil sump is an integral part of the housing—no complicated oil seals to lessen efficiency and complicate maintenance. Oil passages are cored in the housing—no extra hoses and fittings.

Easy accessibility is valuable, too. Simply remove two cover-plates, and the whole unit is fully exposed

for inspection and service—no special tools needed.

The Clark-Torcon is a complete unit, mass-produced, available off-the-shelf to engine and original equipment manufacturers, and to owners and operators. It's the broadest line available to industry, with a wide range of wheel diameters and a complete choice of options, for easy fitting into any torque-transmission system.

There's a Torcon to **FIT YOUR NEED**



This fully illustrated, easy-to-read bulletin explains torque multiplication clearly; and indicates its many industrial applications. Use the coupon to get your copy.

A Complete Quality Line—Clark-Torcon

All Sizes—from 15 to 600 H.P.

Broad Range of Options—readily adaptable to many applications

No Cavitation—proper oil flow prevents turbulence and formation of air pockets to cause wear and loss of efficiency

High Efficiency over wide range—more work done, and reduced wear on components

Individually Cast One-Piece Elements—no welds or fabrications to distort under extreme loads

SCHNEIDER SYSTEM

**CLARK
EQUIPMENT**

CLARK EQUIPMENT COMPANY, Jackson, Michigan Please send the CLARK-TORCON Bulletin

Name _____ Position _____

Firm _____ Address _____

City _____ Zone _____ State _____

areas where water is dirty, corrosive, or in short supply.

A high capacity fan cools each compressor. The fan can be driven either by a separate integrally mounted electric motor or by a V-belt take-off from the compressor fly wheel.

Gages and indicators are mounted on a single control panel. Integral safety mechanisms automatically shut down the compressors in the event oil pressures fall below normal operational limits or air discharge temperatures rise too high. For indoor operation, air inlet and outlet vents on the compressor's intercoolers can be connected to air ducts.—Atlas Copco, 610 Industrial Ave., Paramus, N.J.



Drills at Any Angle

Jaques' hydraulic earth auger drills holes at any angle up to 45 deg from either side of the truck. The unit is a self-contained, completely automatic hole digger and can be mounted on trucks or jeeps. It drills holes from 9 to 72 in. in diameter and up to 25 ft deep. The weight of the truck exerts hydraulic pressure on the auger during drilling operations.

Five different models of the earth auger are available. An optional accessory that sets poles when the holes are drilled is attachable to the machines.—Texoma Enterprises, Inc., Sherman, Texas.

Richmond Concrete Inserts SPEED THE JOB... Safely and Economically

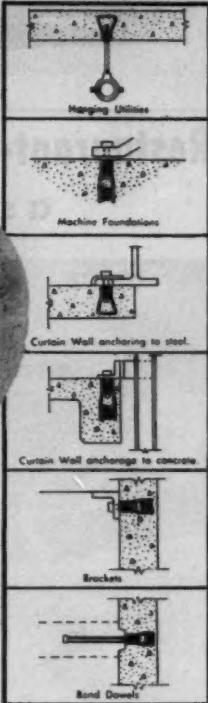
Fastening to concrete made safe and easy by their versatility and strength



New Richmond Structural Concrete Inserts

A recent addition, these inserts are prefabricated from a special design which distributes the bolt stresses into the concrete for greater strength than any previously known device. Laboratory tests show these inserts to have ultimate strengths far in excess to their actual, recommended working loads. This strength performance permits designers to develop the full working strength of bolted connections with more than adequate safety factors. The Richmond Bulletin on Structural Concrete Inserts contains certified test data for these inserts.

TYPICAL APPLICATIONS



Richmond Malleable Adjustable Insert



Peerless Wedge Shelf Angle Insert



Richmond Rocket Insert



Kehler Threaded Insert by Richmond

The variety of types and sizes of Richmond's Concrete Inserts gives you the added assurance of always having the right tool for any hanging or anchoring job. These products are laboratory tested and you can rely on their recommended working loads. They are provided with either holes or lugs which makes nailing them to the forms a simple, speedy operation with no need for drilling of decking or sheathing.



Send for your free copies of this bulletin and the current Richmond Handbook which give you complete data on types, sizes, working loads and the varied uses of these inserts . . . and also show the full line of more than 400 Richmond-engineered Tying Devices, Anchorage and Accessories for the concrete construction industry—write to:



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Heavy Diesel Trucks Offer Many Options

Five engines, nine main transmissions, eleven rear axles, and three front axle positions are available on the 921D and 922D Diamond T diesel trucks.

The power plants include four Cummins diesels with horsepower ratings from 190 to 262 hp and a 218-hp GM diesel. Main transmissions range from four to

12-speed units. Four auxiliary transmissions are optional. A semi-automatic transmission with a split gearsift knob replacing the clutch pedal is also available.

Rear axles include single-speed and two-speed units and range in capacities from 22,400 lb to 29,000 lb. Single and two-speed tandem axle units have capacities from 34,000 lb to 50,000 lb. Front axles include the standard unit, and B and F versions. In the 921DB and 922DB models the front axle is set back 11½ in. from the basic position. The F version has the front axle 1¼ in. forward of the basic position.

Gross combination weight rating of the trucks goes up to 78,000 lb. Gross vehicle weight of the six-wheel units is as high as 60,000 lb. Wheelbases range from 133½ in. to 242¾ in.—Diamond T Motor Truck Co., 4401 W. 26th St., Chicago 23, Ill.

Restaurant-in-the-round: a study in economical forming



Drive-in restaurant, Englewood, Colorado

Architects: Berne, Muchow, Baume & Polivnick; and Polevitzky, Johnson & Associates.

General Contractor: Finegold & Chavers
Forming Contractor: Russell Graham

The specifications for this unusual drive-in restaurant called for a circular basement foundation 70'0" in diameter, 9'4" high; an access tunnel 58'0" long, 9'0" high; and 275' of retaining wall 9'-10" high.

For the circular portion alone, over 2000 square feet of forming was erected for only 14c per square foot. Complete stripping cost was 4¾c per square foot.
JUST 18¾c PER SQUARE FOOT FOR INSIDE AND OUTSIDE FORMING!

Since wood or metal stiffeners are eliminated with Gates thin-panel Forming Systems, the same panels were used to provide true curved radius walls (not a series of flat planes) and long walls that are arrow-straight and smooth.

Regardless of the job, this economy and versatility built into all Gates Forming Systems can reduce your forming costs, too. Contact your nearby Gates dealer or write us direct.

*Only 7c per contact foot.



Gates & Sons, Inc.
80 South Galepage Street
Branches in Spokane, Rochester & Calgary

Denver 23, Colorado

CMAE-8/59

Material Towers

Single and double-well material towers convert to concrete or passenger elevator service when platforms are removed. Two models of towers have live load capacities of 3,000 and 5,000 lb. Either model accommodates two or three wheelbarrows or two concrete carts.

The towers consist of a base, cage platform assembly, bottom sheave assembly, 6 ft 6-in. intermediate sections, top channels, landing panel, and cathead. Accessories include a cage top sheave for use with a two-part line and concrete and passenger elevator equipment. A material handling boom is available in either a 14, 20, or 30-ft length with a 1,000 or 2,000-lb capacity. Parts are interchangeable for erecting single or double towers.—Tubular Structures Corp. of America, 2960 Marsh St., Los Angeles 39, Calif.

CLEAR'S ENTIRE BLAST AREA IN MINUTES!



Trojan 404 Handles Shot Rock on Busy State

Road — Keeps Traffic on the Move

After each blast, move in fast — clear area — move out — keep traffic moving . . . The big 4 yard Trojan 404 is right at home when confronted with such a tight operating pattern . . . Working speed, along with strength and ability to handle heavy, heaped loads of shot rock, established the Trojan 404 as the most valuable piece of equipment on the job . . . The main objective was accomplished — no traffic tie-ups! This is another example of Trojan's proven job performance under exacting operating conditions . . . Ask your local distributor to demonstrate Trojan job ability.



TROJAN®
TRACTOR SHOVELS
YALE & TOWNE



"Nothing speeds job cycles like **TORQOMATIC DRIVE**"

You find it out on the very first job: no equipment you'd put extra money into pays it back as fast as equipment with TORQOMATIC DRIVE.

First place, you need fewer units. For a TORQOMATIC rig works rings around anything with a stick-shift. In trucks, for example, it means bigger units that make more trips per day. Dozers and scrapers make faster passes. Shovels take full bites every time.

What's more, TORQOMATIC equipment *keeps* working. A fluid drive absorbs shocks that mean frequent repairs to ordinary equipment. That also protects engines from strain—drive-lines from shock-load damage. The pay-off: TORQOMATIC users slash *operating costs!*

What's all this mean to you? Simply that money-wise contractors look beyond the somewhat higher price tag on a TORQOMATIC unit. They know you *can't* lose

on equipment that handles bigger jobs—with fewer units—at lower cost—than anything else around.

And remember—you can collect all the TORQOMATIC savings in nearly every type—and over 100 makes—of construction equipment. Just ask your equipment dealer—or write:

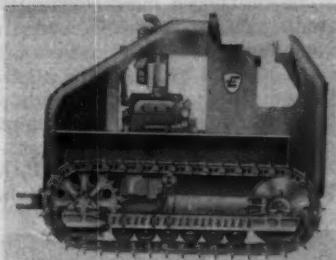
Allison Division of General Motors, Indianapolis 6, Indiana
In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

Allison TORQOMATIC
TORQOMATIC® DRIVES
THE MODERN DRIVE FOR MODERN EQUIPMENT



Portable Storage Plant

A bulk storage plant for gasoline and oil can be set up or torn down in two hours. The plant can use conventional steel tanks or collapsible fabric tanks that roll up into a ball for transportation. Storage capacities range from 5,000 gal upward.—Petroleum Systems, Inc., 2914 E. Grand Blvd., Detroit 2, Mich.



Crawler's Tracks

Operate Independently

Eimco's 103 series tractors feature independently operated tracks that permit smooth spin turns by running one track forward and the other in reverse. Minimum turning radius of the 76-in. wide tractors is 78 in.

The series is available in four basic units. The model 103 is the tractor and dozer with a straight or an angle blade. The basic bare tractor weighs 15,000 lb and develops 13,500 lb drawbar pull. The model 123 is a front end loader or fork lift. It has a 1 1/4-cu yd capacity. Weight is 25,000 lb. The model 133 is a specialized front end loader for steel mill use. The 143 log loader lifts a maximum of 12,500 lb and handles logs up to 4 ft in diameter.

Cummins or General Motors 100-hp diesels power the tractors. The units have torque converter transmissions with dual final drives and four forward and four reverse gears. Power shifting is possible at any engine or tractor speed, even from forward to reverse.

The final drive, center housing, and main frame are one steel



"The Cleveland J-30 doubled my daily production on 100,000 feet of trench"

HOWARD ZACHARIAS OF WELLINGTON, OHIO, a drainage contractor for the last 18 years, has averaged 2,500 feet per day with his new Cleveland J-30, has done 3,500 feet in 7 1/2 hours, compared to an average 1,000 feet per day with other makes he formerly used. He did 100,000 feet of tiling with his J-30 between January 5 and May 1, in spite of adverse weather more than half the time.

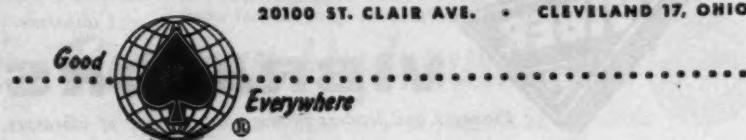
He gives special credit to the J-30's beautiful balance and low ground bearing pressure on its long full crawlers, its easy-rolling 1,000-hour-lubricated track, the big capacity of its independent-drive conveyor, and the "push-button" hydraulic conveyor shift, which he says is particularly useful on tie-ins.

ITS FEATURES TELL WHY

- The world's finest trencher crawlers, 1,000-hour-lubricated, a tremendously long lived, trouble-free, easy-rolling track with big 16" x 3" hydraulic steering brakes.
- V conveyor provides constant elevating angle for faster, higher spoil discharge, with dual independent hydraulic drive and automatic hydraulic shifting.
- The finest, most practical tiling and gumbo equipment.
- Complete visibility and control of every operation at the operator's seat.

The CLEVELAND TRENCHER Co.

20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO



Only Viber offers you Vibrator heads with *Interchangeable* rubber or steel tips!

Eliminate expensive grinding...insure a perfect finish on exposed concrete surfaces...make costly forms last longer...extend the life of vibrator housings!

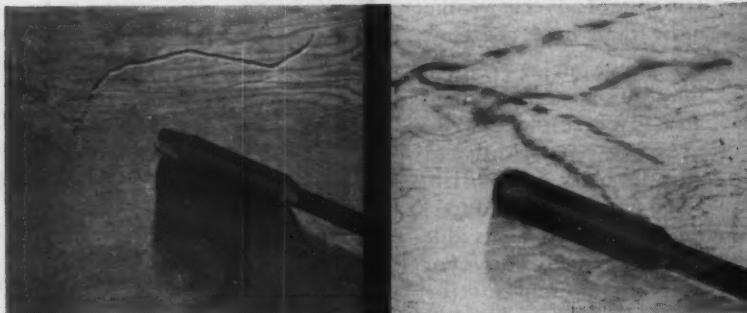


Tips screw on or off vibrator head easily, quickly...may be interchanged as required, replaced when worn.

YOU MAKE MORE PROFIT with Viber Vibrators! Viber replaceable rubber tips end damage to concrete forms and make forms last longer. By eliminating scarring of form faces, Viber rubber-tipped vibrators put an end to grinding and hand finishing of blemishes caused by gouged forms. Vibrator housings last longer because most wear occurs at the tip, which is replaceable.

TAKE YOUR CHOICE! Many contractors prefer steel-tipped vibrators for very harsh concrete with large aggregate, but the majority of Viber owners use rubber-tipped heads on all jobs. Whatever your preference, Viber (and ONLY Viber) gives you a choice of rubber OR steel—and lets you interchange them at will.

WHY NOT WRITE TODAY for the whole story!



Steel tipped vibrator heads often cause deep gouges and scars on form faces (left), producing blemishes on exposed concrete surfaces and requiring expensive grinding and hand finishing. Rubber-tipped heads don't damage form faces any more than a rubber eraser (right), extend form life, produce smooth finish concrete, eliminate hand finishing.

EQUIPMENT NEWS...continued

casting without bolts or welds. All components are accessible and removable. Other design features include the up-front operator position and an engine center-mounted behind the operator's seat. The radiator and fan are remote-mounted with a separate drive.

The transmission features gears that never reverse rotation, even when shifting from forward to reverse. Clutches never need adjusting, and there is no master clutch. The tracks have sealed brakes and hydraulic track take-up. The manufacturer claims that the 103 tractor can climb 90% grades in either forward or reverse.

The units also have constantly running power take-off drives in front and rear. The rear take-off is not affected by track operation. An independent hydraulic pump drive allows simultaneous use of hydraulic winch and hoist accessories.—The Elmo Corp., P.O. Box 300, Salt Lake City 10, Utah.



Roller Tilts, Follows Road Surface

The tiltable Patcher is a road patching roller that is mounted under the frame of a truck. The roll is pivoted at the center and follows the road surface regardless of the position of the truck. An electrically operated hydraulic pump raises or lowers the roller. Hydraulic pressure against the weight of the truck maintains a controlled compaction pressure during idling operations.

The roller is a completely self-contained unit. It has two spring-tensioned scraper blades and a built-in sprinkler system that lubricates the roller. The patcher adds only 700 lb to the weight of the truck, but it is possible to put as much as 3½ tons of pressure on the roller by using the weight of the truck.—Martin Co., P.O. Box 372, Kewanee, Ill.



Viber Company, 726 South Flower Street
Burbank 22
California

VIBRATORS

Pioneers and leaders in the manufacture of vibrators.

MUSCLES under the mainline!

Rodgers Hydraulic Jacks

**push three 88 foot tiles
under railroad without
disrupting traffic**

Two 200 Ton Rodgers Hydraulic Jacks were selected by W. J. Irwin & Sons, Inc., Tonawanda, N. Y. for driving three sewer pipes of 96" I. D. reinforced concrete tile 88' under the mainline of the New York Central Railroad. Part of a 2½ million dollar sewer contract on the Tonawanda West Side Drainage Project, the "push pipe" method was preferred because it permitted unrestricted use of the rail right-of-way overhead.

TIME: 34 DAYS—Actual jacking time consumed 34 days based on three-eight hour shifts a day. Each sewer took eleven 8-foot tile sections. The *First Line* required 14 days; the *Second Line* 11 days and the *Third* only 9 days.



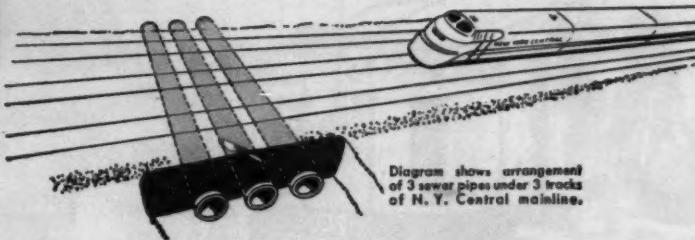
JACKING PROCEDURE—A service pit 28' deep by 22' wide by 40' long was excavated to house the jacking equipment. A pair of 75 lb. steel rails placed on the concrete pit floor cradled the tile sections and acted as a guide for the jacking operation. Type of soil encountered in all three pipes was a mixture of heavy yellow and blue clay.

EQUIPMENT USED—Two 200 Ton Rodgers Hydraulic Jacks with 48" ram travel were powered by a Rodgers Model D2 electric driven hydraulic pump located at the top of the excavation pit. A valve panel located at the bottom of the pit permitted accurate control of the jacking operation.

Steel rails cradle tile sections as twin Rodgers Jacking Cylinders press against the wooden jacking frame. Heavy grease on outside of tile cuts down friction—for easier sliding.

Rear of excavation pit showing Hydraulic Jack against abutment wall. At this stage the ram is extended approximately $\frac{1}{3}$ of the 48" ram travel.

ADVANTAGES OF HYDRAULIC JACKING—This job was handled at low cost and was unique due to the short time required for completion and the fact that rail service overhead continued uninterrupted throughout the tunneling project below. Entirely different from conventional tunneling, the "push pipe" method also provides greater safety to workers from cave-ins since they work inside the tile that is being driven.



If you'd like more details about this job,
write for free copy of Bulletin 331.

Rodgers Hydraulic Inc.

7403 Walker St. • Minneapolis 26, Minnesota

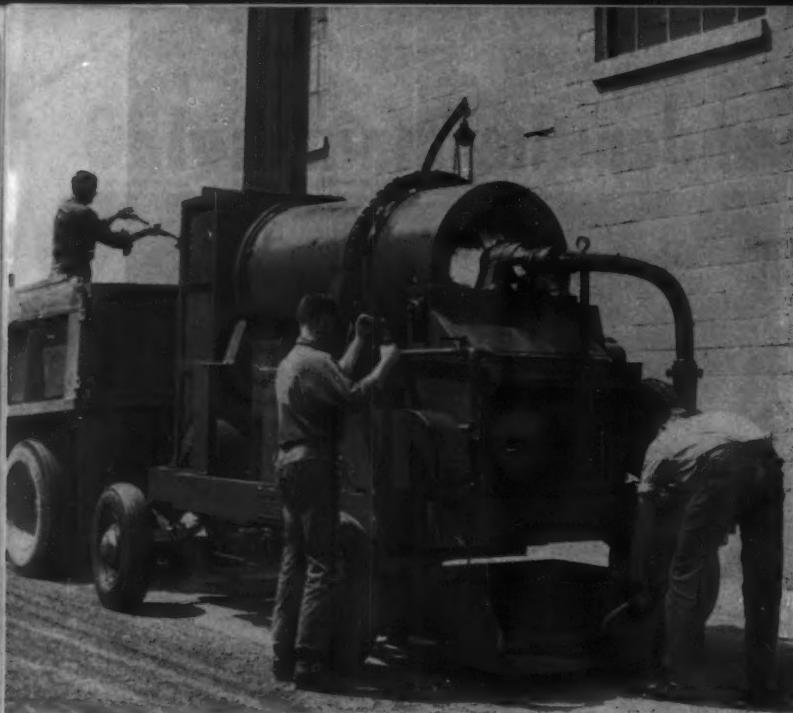


EQUIPMENT NEWS ...
continued

**Truck-Towed Plant
For Small Paving Jobs**

Any truck can tow the White L-6B asphalt plant. It is rated at 6 to 8 tons per hour when producing 300-deg hot mix. When producing cutback or emulsion the capacity is greater.

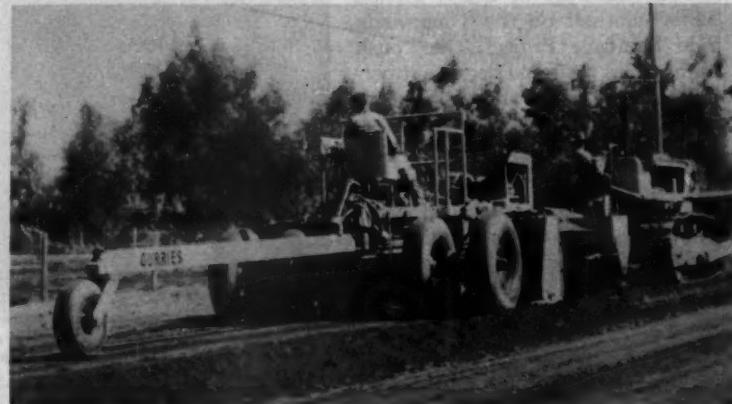
A 3-hp gasoline engine powers the unit. It consists of a rotary drier, a 5-cu ft hopper, and a 500-lb pug mill mixer. Asphalt heating and fuel supply tanks also are part of the plant.—White Mfg. Co., Elkhart, Ind.



**Precision Machine
Produces Smooth Roadbed**

This machine has a 13-ft blade and a 10-cu yd bowl. It handles blading, spreading, rough grading, and finish grading jobs. The Gurries Automatic Road Builder is accurate to 1/25 in. in 15 ft.

The GARB has a 44-ft wheelbase. A hydraulic pendulum controls the cross slope. The operator controls the blade height by means of large dials.—Gurries Mfg. Co., 1720 S. First St., San Jose 12, Calif.



**Two New Truck Cranes
Also Work as Excavators**

Two models of HECO truck cranes have capacities of 9 and 11 tons. The RM-43 handles a $\frac{1}{2}$ -yd shovel. It can lift 15,409 lb with a 30-ft boom at a 15-ft radius with outriggers in the down position. The RM-500 lifts 18,214 lb and handles a $\frac{1}{2}$ -yd shovel. The rigs can be converted to clamshells, draglines, and backhoes. Both cranes can handle a 50-ft boom.

The cranes have a six-wheel drive, a 32,000-lb rear axle, and an 11,000-lb front axle. The rear axle suspension requires no greasing. A torque converter is standard equipment.—HECO Div., Hardwicke-Etter Co., Sherman, Texas.



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Plastic-faced for smoother finish, faster stripping, longer life!



FOR A BETTER JOB, SPECIFY GPX CONCRETE FORM.

Whether it's a skyway, or a skyscraper, this high-density plastic-faced plywood is the ideal concrete form.

Smoothen surface. You get a handsome concrete face, unmarred by grain, checks or patches. In buildings, ceiling slabs can be quickly prepared for painting.

Faster stripping. Smooth waterproof panels won't cling to concrete, are immediately available for re-use.

Longer form life. Form life is limited only by the number of cuts, and handling care. Available in all standard sizes and can be custom-sized. Write today for sample, specifications, and local source. Address Georgia-Pacific, Dept. CME-859, Equitable Bldg., Portland, Oregon.



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New Ford F-100 4-wheel drive Styleside pickup handles heavy loads and makes its own road.

Now from FORD... America's lowest-priced 4-wheel drive pickups... Six or V-8!

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. . . FOR GREATER SAVINGS!**

Go *Ford-ward* for 4-wheel drive performance at big Ford savings. They're factory-engineered for extra stamina, and all Ford-built with your choice of economical Short Stroke power—Six or V-8.

There's new versatility too, with two power take-

off points in the transfer case to drive winches, saws, diggers, or other equipment. And there's new driving ease. You shift smoothly between 2- and 4-wheel direct drives while moving.

Ford 4-wheel drive trucks are available in $\frac{1}{2}$ - and $\frac{3}{4}$ -ton pickups, chassis-cabs and $\frac{3}{4}$ -ton stake models. See your Ford Dealer . . . save hundreds of dollars on America's lowest-priced 4 x 4's with Six or V-8!

FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . . LAST LONGER, TOO!

Plan '59

To modernize now for growth and profits

Goes Into High Gear

In 1959, industry will spend more money than ever before to modernize its plant and equipment. But it is not spending enough to do the job that needs to be done.

Manufacturing companies* now plan to spend a total of \$24.5 billion on modernization in the four years 1959-1962. This will be enough to replace roughly 70% of the obsolete facilities that were on hand at the beginning of 1959. But it will still leave us far short of our goal. It would take several years, at a higher rate of investment than is now planned, to wipe out obsolescence and give the U. S. a truly modern industrial plant.

These facts stand out from the 12th annual Survey of Business' Plans for New Plants and Equipment just completed by the McGraw-Hill Department of Economics. This new survey shows that industry has made a remarkable start on the modernization job that a previous editorial in this series described as "the most expensive task to be performed in America in this new year of 1959." The full cost of modernization has been found by the McGraw-Hill Department of Economics to be \$33.3 billion for manufacturing, and \$95 billion for all business.

For the past several months, McGraw-Hill publications have been devoting special attention to new developments in plant and equipment

that offer opportunities for modernization. Our special effort to help industry in this regard has been called "Plan '59": to modernize *now* for growth and profits. This editorial will summarize the progress made so far with "Plan '59" and point out some of the areas where business and public policies can do still more to accelerate the modernization drive.

A Good Start

Business investment in new plant and equipment has picked up sharply since the low point of the 1958 recession. Plans for 1959 now show a 7% increase over 1958 for total capital investment. And the increase in expenditures for modernization is much sharper. Moreover, companies already have substantial plans for the years after 1959. New orders for industrial machinery, which are a good index of modernization plans, also are running well ahead of last year.

For the four-year period 1959-1962, manufacturing companies expect, on the average, to devote 65% of their plant and equipment outlays to modernization. This is the highest proportion reported in a McGraw-Hill survey since 1950. In dollar terms, manufacturing companies plan to spend \$24.5 billion on modernization during the next four years.

This is an impressive figure, but it does not look so large when compared with the total need

*Excluding petroleum refining, which is reported as part of the oil industry in the data discussed in this editorial.

for modernization in manufacturing industries. As noted above, a previous McGraw-Hill study (conducted in August 1958) found that it would cost almost \$35 billion to replace all the facilities that manufacturing companies then considered obsolete. Thus, present plans for modernization are enough to wipe out only 70% of the backlog of obsolete facilities by 1962—and this makes no allowance for the additional facilities that will be made obsolete by new machines and new processes introduced during the next four years. When these new developments are considered, present plans for spending may represent only half the job that will actually need to be done.

How To Accelerate

What can be done to accelerate the drive to modernize our industrial plant and equipment? Two of the greatest aids would be:

(1) Improve present provisions under the tax law for depreciation, to help industry retain more of the money it needs to carry out this massive job of modernization;

(2) Contain inflation, to preserve the purchasing power of the money industry sets aside to replace obsolete facilities.

At first glance, the supply of funds from depreciation allowances appears to be more than adequate. For manufacturing as a whole, depreciation allowances—the primary source of cash for modernization—will total \$8.3 billion in 1959, compared with present modernization plans of \$6.4 billion. Thus some extra funds will be available to support a further step-up in modernization in 1960.

Unfortunately, however, these depreciation funds are not evenly distributed from industry to industry, or from company to company. For example, in several of the metalworking industries, the prospective flow of cash from depreciation during the next four years is much less adequate than for manufacturing as a whole. These are industries with relatively large modernization backlogs, and they also are industries made up mostly of small or medium-size companies that have difficulty tapping the public money market.

As a result of these industry and company differences, there are many individual cases where shortages of funds limit the amounts of modernization now planned. In the McGraw-Hill survey, nearly half of all companies participating said that they would spend more on new plants and equipment if the depreciation allowances permitted by the tax law were increased substantially over the next few years. Most of these were relatively small companies. Their answers suggest that revision of the tax rules on depreciation should receive the most careful consideration as a spur to faster modernization.

The problem is complicated also by the threat of further increases in the national price level, which would necessarily include prices of capital goods. If "creeping inflation" resumes its march during the next four years, depreciation allowances based on present costs will be much less adequate for future needs. This points up the importance of national economic policies to maintain price stability. Unless this can be maintained, industry's dollars will not go far enough to do the modernization job that is needed.

Plan '59 Carries On

Industry's drive to modernize is now well underway. It can make a key contribution to our national strength and prosperity in 1959 and the years ahead. But the biggest part of this job is before us. It is up to the policy makers—in both business and government—to see that the job is done.

This message was prepared by the McGraw-Hill Department of Economics as part of our company-wide effort to report on opportunities for modernization in industry. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or part of the text.

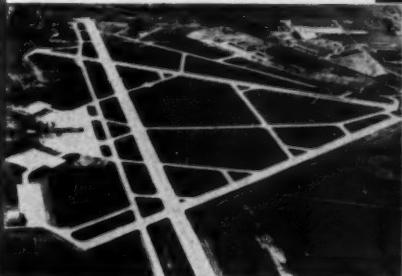

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

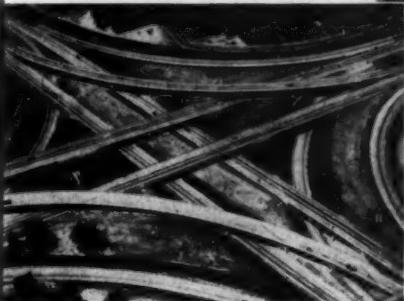
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Right: This dramatic view of Shasta Dam in California demonstrates the progress made by construction engineers in conserving water supply, preventing flood destruction and providing water needed to make arid land useful again.



Above: To meet the challenge of the jet age, engineers and contractors are being called upon to build and expand airport runways to handle increased traffic. (View shows Lambert Field, St. Louis.)



Above: This view of one of the interchanges on the high speed Detroit expressway is a striking example of the contribution the construction industry is making to the tremendous highway program.



In aggregate and sand production . . . as in all of the great ore and industrial mineral operations the world over . . . there has been no record to equal the performance of Symons Cone Crushers that have so consistently and efficiently produced great quantities of finely crushed product at low cost.

Whether you are a contractor, operator, construction engineer, designer or manufacturer, it will pay you to specify and use Symons Cone Crushers for primary, secondary, or finer reductions, in capacities to over 900 tons per hour. Write for literature.

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

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New Publications

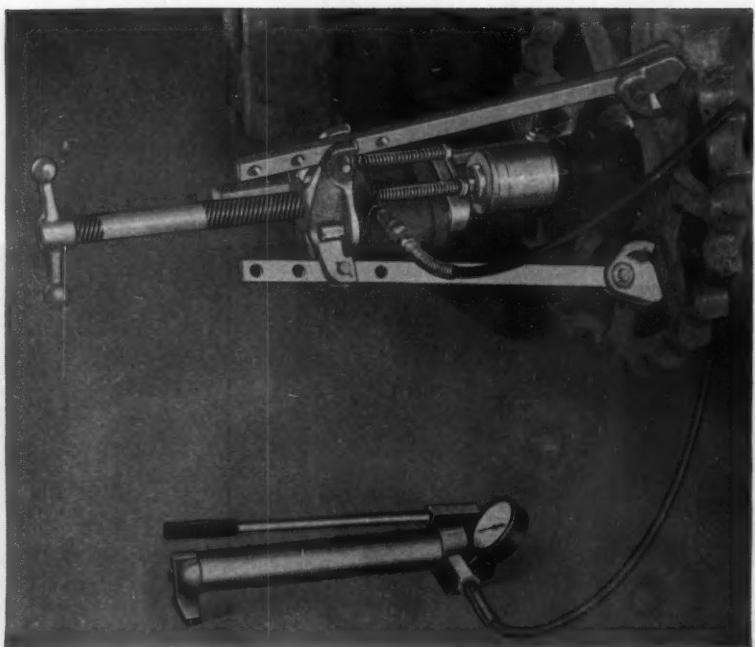
These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

BOLT ASSEMBLIES—Republic Steel has published a 16-p catalog on high strength structural bolt assemblies. Information on how to order high strength bolts is included. The basic ASTM specification A-325 for high strength bolting is printed in full, plus an appendix which explains in more general terms the main points of the specification.—**Republic Steel, 1141 Republic Building, Cleveland 1, Ohio.**

ARC WELDING—Two publications, one a manual and the other a text, are available from the American Welding Society. "Arc Welding Training Manual" is designed specifically for welders and instructors of manual arc welding. Contents include welding processes and recommended safety practices, accessories, exercises in arc welding, and arc welding equipment. The manual is priced at \$3 post paid. The text, "Arc Welded Joints" was prepared by the National Electrical Manufacturers Association for use in college courses. Single copies are free to educators, 25¢ to students.—**American Welding Society, 33 West 39th Street, New York 18, N. Y.**

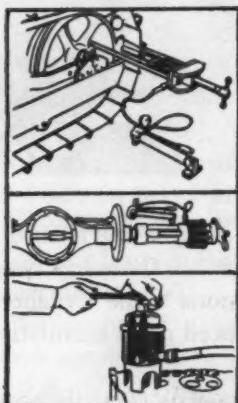
AIR STARTING MOTORS—A 24-p bulletin on air starting motors, prepared by Ingersoll-Rand, contains case histories on installations and information on their proper selection. It provides detailed specifications and mounting dimension diagrams for all IR air starting motors. A 9-p selection list shows the size and model number of the air starting motor required for most models of the diesel, gasoline, natural gas, or dual-fuel engines of 29 motor manufacturers.—**Form 5094E, Ingersoll Rand Company, 11 Broadway, New York 4, N. Y.**

DRAGSCRAPER METHOD—A Sauerman field report explains how the reach of a dragline crane can be extended by using the hoisting line as a track cable for



One man pulls sprocket in minutes... on-the-job...with OTC puller-installer

One man, in minutes can pull or install a tractor sprocket on-the-job with an OTC hydraulic puller-installer set. Saves hours, even days, of costly down-time. Special pullers with up to 100 tons of hydraulic power are designed in co-operation with major tractor manufacturers to do all types of maintenance jobs—fast—without damage to parts. One basic hydraulic unit with special attachments will handle a variety of tractors.



VERSATILE RAM AND PUMP AVAILABLE FOR MANY OTHER JOBS

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Truck Axle Tube being removed with OTC Hydraulic unit and accessories. Same unit installs tube — fast — without distortion.

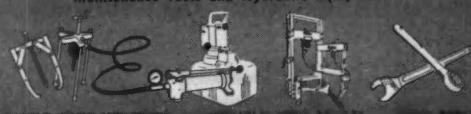
Valve Seat Insert being pulled with 17½-ton Power-Twin ram and pump. Takes little effort and does not damage cylinder head. Three sizes fit most engines.

See your OTC Distributor or write—

OWATONNA TOOL COMPANY

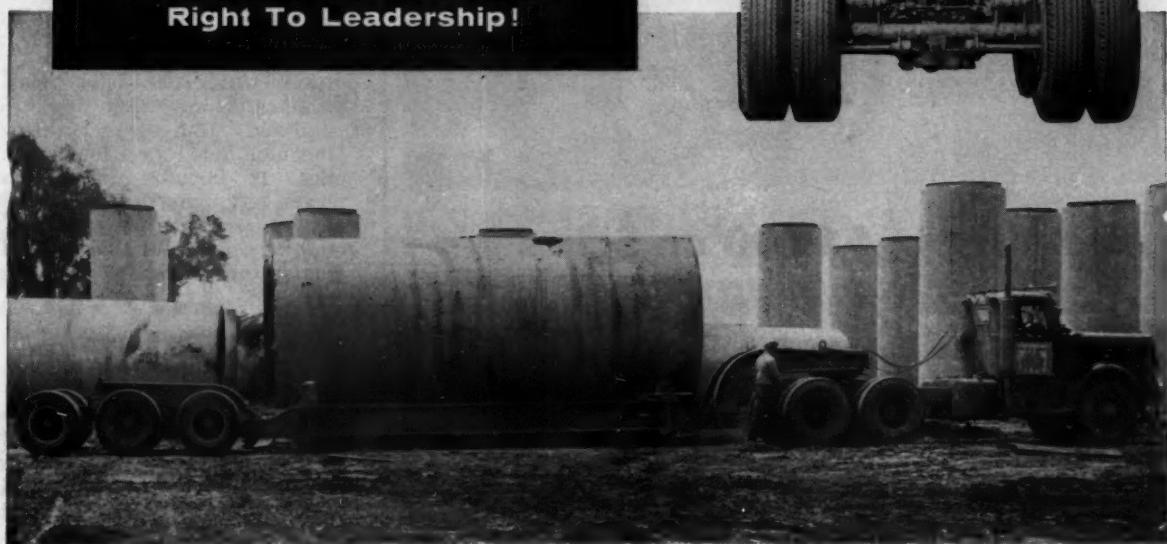
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Performance of TALBERT
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White Brothers of Dayton, Ohio, had no trouble hauling big loads like these 37 ton, steel-reinforced, concrete pipes. Talbert's rugged dependability and proven performance are making tough jobs routine all over the country. TALBERT TRAILERS are designed to meet any hauling requirement—large or small!

TALBERT'S interchangeable decks and rear axle assemblies custom-fit *one* TALBERT TRAILER to many hauling needs. The removable Third Axle,† used above, reduces individual axle load to meet hi-way load restrictions. Talbert's Removable Gooseneck,* often copied but never equaled, permits fast, economical, one man operation.

Whatever your hauling problem...see your TALBERT DISTRIBUTOR for the right trailer combination for you! See him today—or write for detailed information.

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*U.S. PAT. 2,489,112 CAN. PAT. 472,905

†U.S. PAT. 2,760,784 CAN. PAT. 565,344

NEW PUBLICATIONS... continued



Schramm Portable 125 Compressor gives any contractor a real break on initial cost—and on operation, too. Reason: modern, economy-loaded piston design. Gives more power, uses less fuel. Available: gasoline or diesel.

Save up to \$1700 on Schramm 125 Compressors

Why pay more than necessary for a 125 cfm air compressor? Schramm gives you the lowest initial cost of any compressor manufacturer—plus additional cost savings in operation and repair. However, this lower cost is not from price slashing or quality cutting shortcuts, but is the result of lower manufacturing costs inherent in the production of piston-type compressors. It's a fact—you get superior quality at lower cost from the simplified design which can be manufactured more economically.

You also get increased savings with...

Lower fuel consumption Schramm Model 125 uses from 15% to 50% less fuel than competitive air compressors. Yet it delivers more power—a full 125 cfm of air, not just a fraction of it.

Less Maintenance Operating features of piston-type design provide more fool-proof operation, result in less downtime. Any mechanic can easily service without special training.

Fewer and Less Costly Replacement Parts 90% of the wearing parts between engine and compressor are interchangeable, fewer parts to replace. Replacement parts also cost less—as much as one-seventh of competitive parts.

Don't spend one cent extra for any size compressor until you can investigate all the facts. See your local Schramm Dealer, or write today for your copy of Bulletin SPB-58.

See the Yellow Pages for local Sales, Service and Rental of Schramm Air Compressors.

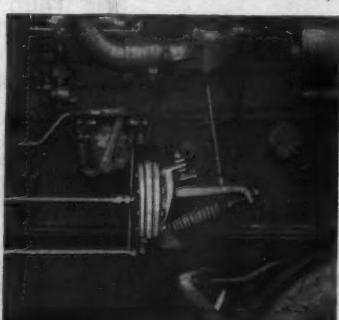
Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

604 North Garfield Ave. • West Chester, Pa.



Schramm Portable 125 powers two pneumatic tools with full 125 cfm of air... produces full rated power—increases workers' efficiency.



Automatic air control is a feature of Schramm Compressors. The patented Schramm Pneumastat controls speed of each unit without operator manipulation. Engine operates from idle to full speed according to air demand.

a Crescent DragScraper and carrier assembly. Line drawings and photographs of dragline cranes equipped with DragScrapers are shown in a variety of ways in long range excavation work.—**Field Report** 231, Sauerman Bros., Inc., Dept. C-30, 612 S. 28th Avenue, Bellwood, Ill.

OUTBOARD PROPULSION—A 12-p booklet gives up-to-date information on Harbormaster outboard propulsion and steering units for attachment to unpowered craft such as barges or scows. Included are features of design and construction and specifications of the 40 to 500 hp gas or diesel models.—**Murray & Tregurtha, Inc.**, 80 Hancock Street, Quincy 71, Mass.

MONOTUBE PILES—Union Metal Manufacturing Company has published a 24-p catalog covering Monotube fluted steel foundation piles. It includes installation photos, test diving data, and technical information for engineers, and architects.—**Union Metal Manufacturing Co.**, Canton 5, Ohio.

ALUMINUM WELDING—Air Reduction Sales Co. has issued a survey of the techniques of welding aluminum using Aircomatic (gas shielded metal-arc) and Heliweld (tungsten-inert-gas) processes. This 120-p spiral bound book—entitled "Aircomatic and Heliwelding of Aluminum" covers the subject from the first uses of this process of welding aluminum to today's specialized aluminum fabrications. Weldability of aluminum and its alloys, definitions and technical discussions of the two welding processes, selection of the proper process for certain job applications, descriptions of manual and automatic equipment, welding power supplies, and safety practices are among the topics discussed.—**Air Reduction Company, Inc.**, 150 East 42 St., New York 17, N. Y.

SCRAPER AND TRACTOR—Allis-Chalmers has published two new booklets. One gives engineering and operating details of the TS-260 motor scraper powered by the new 16000 diesel engine. The other covers HD-6 diesel powered crawler tractor. Both contain pictures, graphs, charts,

Colorado Contractor solves time-cost problem . . .

Builds 4000-cu. yd. dam in 3 days



Speeds work . . . cuts costs with 2 CASE Terramatic® Drive Crawlers

Out in the range country around Springfield, Colo., Contractor Marion Chenoweth is building a series of 1000 to 9000-cu. yd. dams, to control erosion and form watering ponds for stock. To bid competitively, Chenoweth uses two Case Terramatic Drive dozers, equipped with 5 and 8-yd. pull-type scrapers instead of larger, more expensive earthmovers.

Smooth, jerk-free loading

Terramatic Drive is a big factor in increasing scraper production, according to Chenoweth. The torque converter "cushions" all shocks of pusher-loading . . . doubles pull-power instantly, automatically, without clutching, shifting or stalling. Power-shift transmission and counter-rotating tracks also increase maneuverability . . . let operator shift from low to high get-away speed, on-the-go, without loss of momentum.

Chenoweth's Model 1000, which develops up to 25,400 lbs. drawbar pull, loads an 8-cu. yd. scraper in 30 to 40 seconds, with pusher assistance.

The Model 800, with up to 20,700 lbs. pull, fills its 5-yd. scraper in the same length of time. Average 400-ft. cycle

takes only about 3 minutes, enabling the two rigs to complete a 4000-cu. yd. dam in 3 days.

Dozer blades tilt hydraulically

Chenoweth says the additional front-end weight of the dozer gives his Case machines increased traction for scraper loading. In addition, operator can drop either corner of the blade hydraulically, from the operator's seat, for ripping hard ground in front of scraper, when self-loading. "In fact," adds Chenoweth, "this combination of the Case power-tilting blade, and hydraulic Terramatic Drive is the best deal I've found yet for building small dams and ponds, clearing out fence-rows, digging basements and handling custom-excavating jobs."

Your Case Industrial Dealer will be glad to show you the advantages of Terramatic Drive right on your job. See him soon . . . and ask about convenient Case finance terms with skip-payment privileges.

J. I. CASE CO., Dept. H1499, Racine, Wis.

- Send free literature on Case 800 and 1000 dozers
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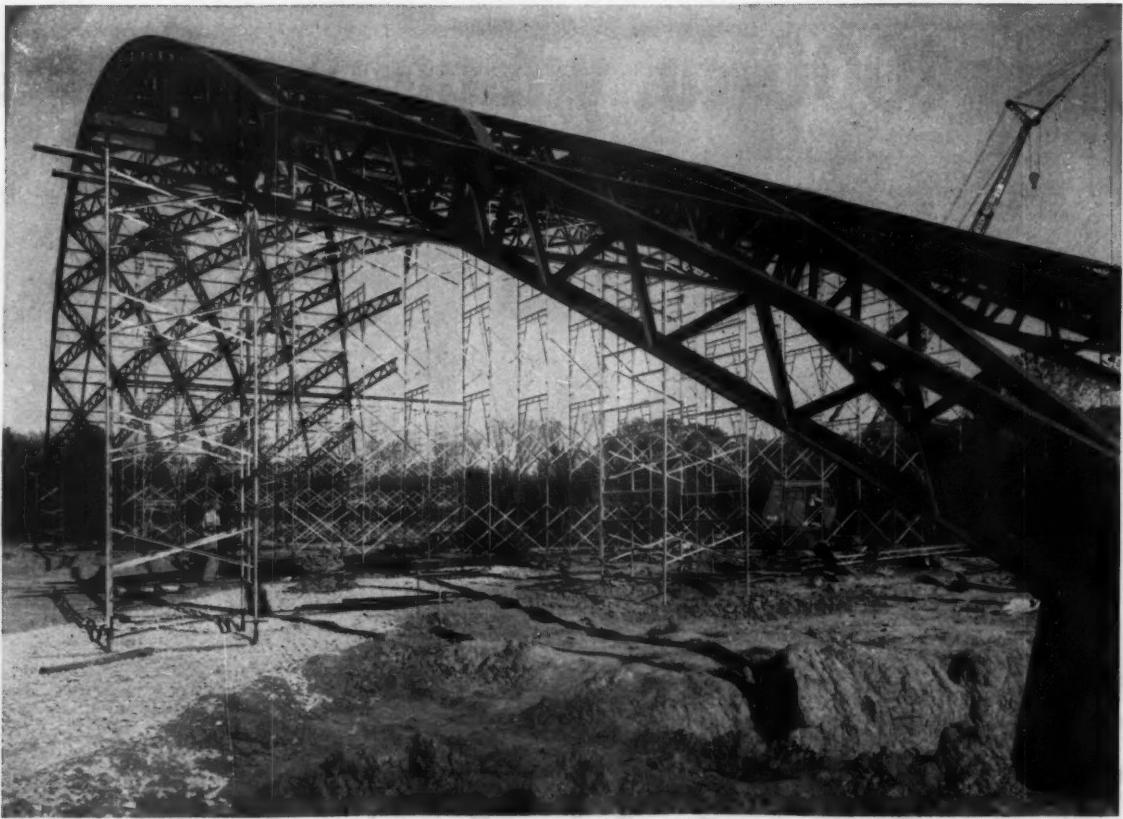
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STEEL LAMELLA roof construction of new Ladue H.S. Auditorium, St. Louis, being shored with "Trouble Saver" Steel Shoring. Cristina Constr. Co., gen. contr. Kroger Erection Co., steel erectors. One of three recent jobs, see below.

New Shoring Method Cuts Steel Erection Time 20%

THE USE of prefabricated PS Co. Steel Shoring components as temporary cribbing for the support of steel beams and girders on three recent steel erection jobs is now showing that erectors can save up to 20% of the time needed on job completion dates over former methods. Steel shoring offers the same money-saving advantages to steel erectors as it does to concrete contractors.

Considerable materials and equipment savings are being evidenced. The pre-fab steel shoring components are more easily and quickly handled and assembled, are completely reusable, and can be rented for the particular job. Mobile cranes and other heavy equipment can be kept down to a minimum, as well.

Three types of equipment are available for shoring of steel:

1—Standard components of prefabricated "Trouble Saver"® Sectional Steel Shoring, consisting of 3' to 6'6"-high end frames, diagonal braces for a variety of frame spacings, fast-acting Slide-Loks, bases, U-heads and adjustable screw legs.

2—Extra Heavy Duty Shoring, consisting of 3½" dia. legs which can be spaced in multiples of 6'4" or 8' in both directions, braces and girts. Sections are 6'6" high.

3—"TubeLox"® Steel Shoring, consisting of interlocking 2" or 2½" O.D. tubular steel members in 6' to 20' lengths, right angle couplers, adjustable couplers, diagonal braces, bases and "TubeLox" wrench.

Modern shoring equipment speeds steel erection on these three typical construction jobs:

Ladue H. S. Auditorium, see photograph above.

New Hangar No. 17, Idlewild Airport, N. Y., with 158'-long steel box girders shored with 16 towers, each side, made of Extra Heavy Duty Steel Shoring components. White Plains Iron Works, Inc., steel erectors.

Steelwork for the new overpass over downtown St. Louis shored with "TubeLox" Steel Shoring. St. Louis Steel Erection Co., contractors.

Complete scaffolding equipment and engineering service offered through nation-wide sales offices or representatives. Look under Patent Scaffolding in the Yellow Pages for your nearest source.

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NEW PUBLICATIONS . . .

continued

and illustrations.—Construction Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

FORGED TRACKS—Athey Products Corporation has issued a 12-p booklet describing Athey Forged-Traks. Photographs and diagrams show track-mounted wagons and trailers in construction, illustrating their stability.—Athey Products Corporation, 5631 West 65th St., Chicago 38, Ill.

FENCE CATALOG—“American Fence Products” is a 42-p general catalog listing fence and other products of the American Steel & Wire Division of U. S. Steel Corp. In addition to fences and posts, the catalog covers bale ties, hardware cloth, nails, roofing sheets, welded wire fabric, and stone wire.—Advertising Department, American Steel & Wire Division, U. S. Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio.

BELT DRIVES—A new 44-p bulletin, No. A-695, by Dodge Mfg. Corp. describes their line of v-belt drives that are smaller, lighter, and less costly than conventional v-belt drives. Tables give horsepower capacities, belt speeds, center distances, sheave diameters, etc.—Dodge Mfg. Corp., Mishawaka, Ind.

CUTTING EDGES—“Here’s the Inside Story on Cutting Edges” is the title of an 8-p, two-color booklet just issued by the Construction Equipment Division of International Harvester. It describes how operators can get longer life from the cutting edges on dozers and scrapers with IH Durablades. These blades, produced by a special heat-treating process, have a surface hardness giving two to four times longer life than untreated blades. Booklet CR-177-1.—International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.

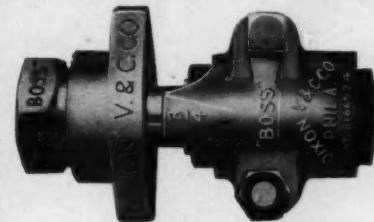
TOOTH CATALOG—A 16-p catalog covers over 400 tooth point and tooth adapter models to suit every make of shovel, dipper, and backhoe. Described is Amsco’s new Simplex two-part reversible point dipper tooth.—Department A, American Manganese Steel Division, 389 East 14th St., Chicago Heights, Ill.

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Glen Canyon Dam will be built for the U.S. Bureau of Reclamation. Prime contractor: Merritt-Chapman & Scott Corp.

They bolted the face of this 700-ft cliff

This sheer canyon wall will soon form one side of Glen Canyon Dam which will arch 1500 feet across the Colorado River in Arizona. The dam when completed will store water to generate electric power for a five-state area. Here you see construction workers, hundreds of feet above the river, drilling holes in the rock face of the cliff with Bethlehem hollow drill steel.

After the holes are drilled, Bethlehem slotted rock bolts are installed. When the bolts are driven, a steel wedge, previously inserted in the slotted portion of each bolt, spreads the bolt ends to provide firm anchorage. The

bolts clamp the layers of rock together, stabilizing them. Square anchor plates were used for additional support.

In addition to the slotted bolt, Bethlehem also makes a headed bolt for rock control. It has a $\frac{3}{4}$ -in. diameter, and is used with a leaf-type expansion shell.

If you have a rock control problem, we'll gladly work with you in solving it. Just say the word, and we'll have a representative examine the site, and make recommendations. Our nearby sales office is at your service.

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Construction Methods AND EQUIPMENT

330 WEST 42nd STREET, NEW YORK 36



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LONGACRE 4-3000

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Methods Memo...



Nylon Dam

This big tube of nylon fabric coated with neoprene saves a lot of Los Angeles River Water that otherwise would run off into the Pacific Ocean.

The Los Angeles Department of Water & Power maintained a wood dam in this location for many years to divert water into nearby basins. But the department had to pull out the wood dam during the winter months—when the river frequently reaches flood level—to prevent the river overflowing its banks.

Big advantage of the nylon dam is that it remains in place all year long. It can be collapsed in 10 minutes should a flood threaten and inflated again by pumping water into it in about 25 minutes.

The tube is 150 ft long and 8 ft in diameter. It holds 50,000 gallons of water fully inflated. It was manufactured by the Firestone Tire & Rubber Co.

Auction by TV

Contractors can attend a big auction of construction equipment on Oct. 7 without getting close to any of the machines.

The auction will be the first ever conducted by closed-circuit TV and two-way radio. Up for sale will be surplus military equipment with an original value of \$1.5 billion.

Mobile TV units will move about the Army's Engineer Depot at Granite City, Ill., the Navy's Philadelphia Shipyard, and the Air Force's Shelby, Ohio, depot. Buyers can look over the machines on TV screens in New York, Boston, Philadelphia, Columbus, Chicago, and St. Louis. Bidding will be by two-way radio.

The Army's Quartermaster Corps will be in charge of the all-day auction. A lot of earthmoving and paving equipment, along with trailers, generators, and machine tools, will be placed on the block.

Cold War Concrete

Those Russians, so expert at busting atoms and flying rockets, apparently are pretty clumsy at pouring concrete slabs.

The floor slabs they laid for the American exhibition in Moscow crumbled so badly that pedestrian traffic raised "clouds of dust" in the domed exhibition hall. All the bright, shiny American consumer products on display were cloaked in dust. One disgusted U. S. official dubbed the exhibition building, "The Dust Bowl."

It's hard to guess the reason for such sloppy work. Surely the Russians know what it takes to do the job properly. Plenty of information about concrete construction is available, and none of it is marked "secret."

Maybe it was just one of those things that could happen to the most careful builder. Or maybe it wasn't the fault of the Russian concrete men at all. Maybe the Kremlin simply decided to use these slabs as another weapon in the Cold War.

Contractor Goes to Court

A Federal court will decide the dispute between Merritt-Chapman & Scott Corp. and the City of Seattle's Department of Lighting over construction of Gorge High Dam.

MC&S has asked the court to declare its contract for this job no longer in force because of numerous changes in the "method, manner, scope, and time of performance of the work."

The contractor says the Lighting Department has issued more than 100 change orders to date, most of them having to do with construction of a "freeze curtain" to divert the river from the dam site during construction.

Original estimates were that this freeze curtain could be completed in 90 days at a cost of \$566,000. MC&S says it took 589 days and cost \$5,156,000. The contractor had to drill a lot more holes than estimated, increase the capacity of the refrigerating plant, and supplement the freeze curtain with a grout curtain.

The contract price was \$14,735,107. MC&S estimates the total cost of the project will be \$21,663,060. The Lighting Department already has allowed total payments of \$15,319,357 because of the extra work required.

Builder Tully's words of wisdom

1.



"I've been a builder forty years," Phil Tully told his boy,
"I'm giving you my company, my greatest pride and joy."
Now, sound advice was also part of Tully's legacy:
"Get Travelers for construction bonds—a solid policy."

2.



As boys are wont to, Tully, Jr. flouted Dad's advice—
He figured bonds were all alike, and *any* would suffice.
He did not call The Travelers when a big job came along;
He couldn't enter *any* bid—his bond was late and wrong.

3.



"I'll never make the same mistake again," our hero swore,
"My patriarch advised me right: it's Travelers evermore."
That day he called The Travelers, "Hasten! Satisfy my need:
I want a bond—I want it fast—with supersonic speed."

4.



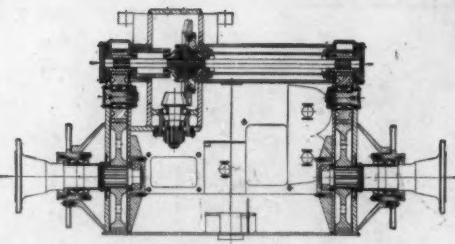
He hung the telephone back up and wow! Was he surprised—
Before his eyes was Travelers' man, as fast as advertised.
Why let a tardy bond derail *your* well-laid bidding plan?
For speedy bonds and expert service get a Travelers man.

NOTE: Comp, Equipment Floaters—Builders' Risk Insurance, too
Are other ways The Travelers helps a contractor like you.

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Insurance Companies

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All forms of business and personal insurance including Life • Accident • Group • Fire • Marine • Automobile • Casualty • Bonds



How **ALLIS-CHALMERS** mounts Timken bearings in the transmission of its TS-360 motor scraper to take heavy loads, cut maintenance.



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THIS Allis-Chalmers TS-360 motor scraper digs, hauls and spreads 20 yards at a crack. And its big, 280-hp diesel engine means more trips per hour. With 28 Timken® tapered roller bearings to roll the loads—in outer and inner wheels, pinion, differential, idler gear and cable unit—TS-360 users get built-in trouble-free operation, long bearing life with minimum maintenance. Here's why.

- 1) *The tapered construction of Timken bearings lets them take heavy radial and thrust loads in any combination.*
- 2) *Full line contact between rollers*

and races gives Timken bearings extra load-carrying capacity.

3) *By holding shafts concentric with housings, Timken bearings make closures more effective in keeping dirt out, lubricant in, maintenance down.*

4) *And Timken bearings are made of finest steel. We make it ourselves to be sure. We're America's only bearing maker that does.*

For 42 years Timken bearings have been making construction machines better. To be sure you get better machines, make sure they're equipped with Timken tapered roller bearings.

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*First in bearings
for 60 years*

